US009087439B2

(12) **United States Patent**
Kitamura et al.

(10) **Patent No.: US 9,087,439 B2**
(45) **Date of Patent: *Jul. 21, 2015**

(54) **GAMING MACHINE HAVING NORMAL GAME MODE AND CHANCE GAME MODE**

(71) Applicants: **Universal Entertainment Corporation**, Tokyo (JP); **Aruze Gaming America, Inc.**, Las Vegas, NV (US)

(72) Inventors: **Kenta Kitamura**, Tokyo (JP); **Tatsuya Teranishi**, Tokyo (JP); **Masumi Fujisawa**, Tokyo (JP)

(73) Assignees: **UNIVERSAL ENTERTAINMENT CORPORATION**, Tokyo (JP); **ARUZE GAMING AMERICA, INC.**, Las Vegas, NV (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 155 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **13/868,206**

(22) Filed: **Apr. 23, 2013**

(65) **Prior Publication Data**

US 2013/0303257 A1 Nov. 14, 2013

(30) **Foreign Application Priority Data**

May 10, 2012 (JP) 2012-108157

(51) **Int. Cl.**

A63F 9/24	(2006.01)
A63F 13/00	(2014.01)
G06F 17/00	(2006.01)
G06F 19/00	(2011.01)
G07F 17/34	(2006.01)
G07F 17/32	(2006.01)

(52) **U.S. Cl.**

CPC ***G07F 17/34*** (2013.01); ***G07F 17/326*** (2013.01)

(58) **Field of Classification Search**

CPC G07F 17/3267
USPC 463/16–20
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,097,048	A	6/1978	Poulsen
4,508,345	A	4/1985	Okada
7,871,327	B2	1/2011	Walker
7,942,733	B2	5/2011	Sakuma

Primary Examiner — Kevin Y Kim

(74) *Attorney, Agent, or Firm* — Lexyoume IP Meister, PLLC

(57) **ABSTRACT**

The present invention provides a gaming machine which can provide games that are prevented from progressing monotonously and thus can provide a player with a feeling of tension, thereby facilitating the consumption of more gaming media. A currently played chance game is discontinued and the chance game is started afresh from the first game under the condition that a second symbol appears on a symbol display unit upon the number of games being less than a predetermined number in the chance game mode.

4 Claims, 22 Drawing Sheets

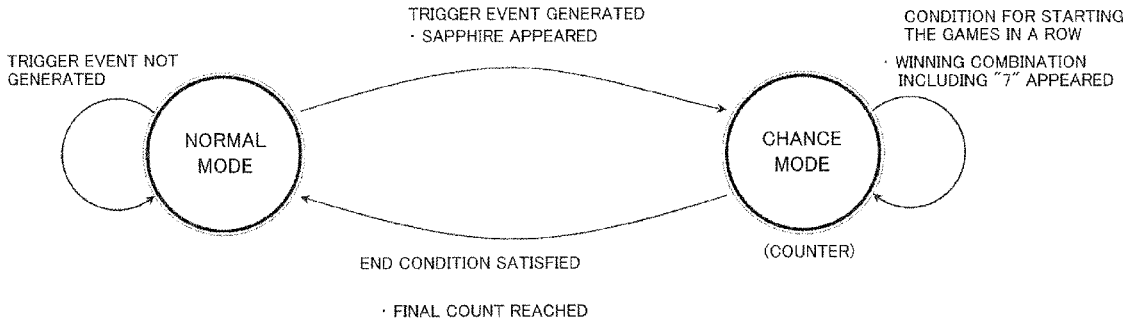


FIG. 1

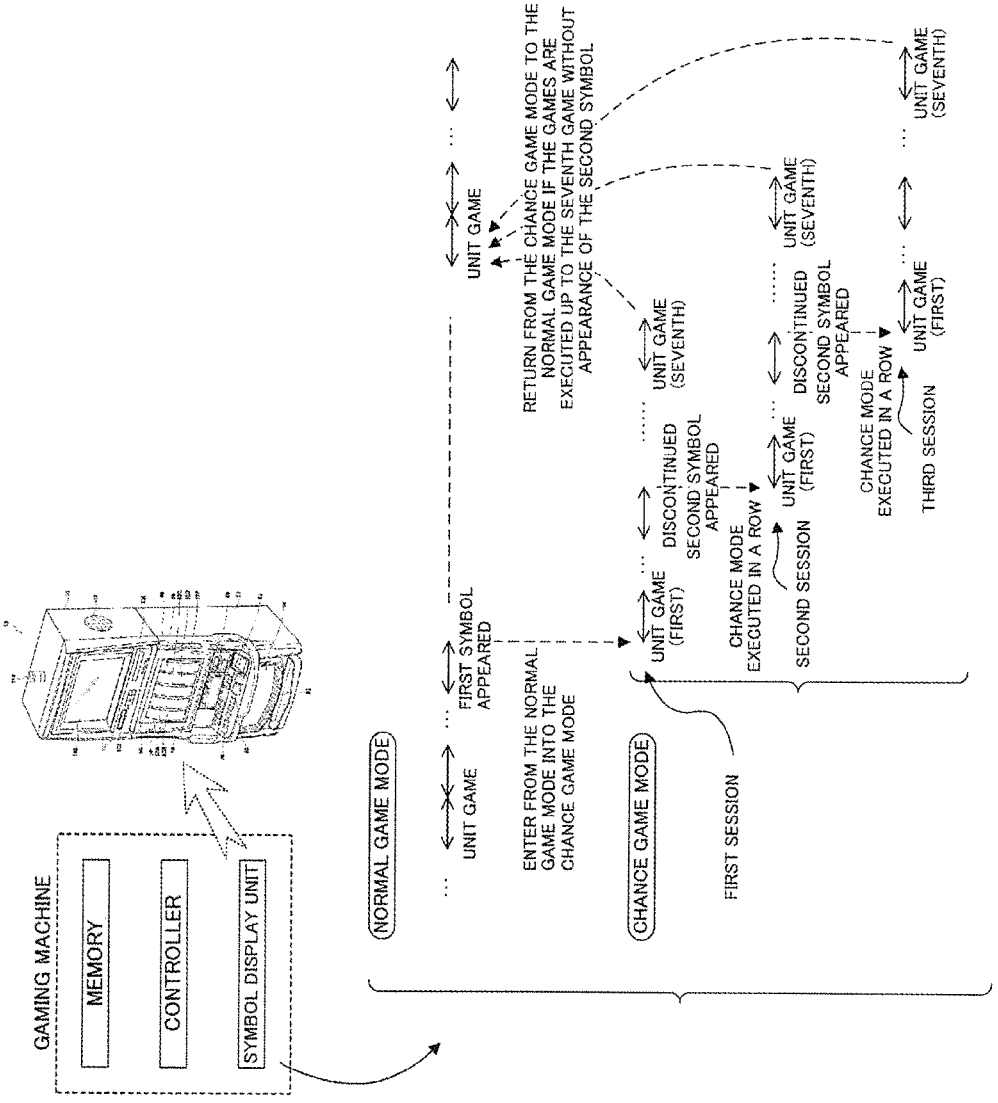

GAMING MACHINE
MEMORY
CONTROLLER
SYMBOL DISPLAY UNIT
NORMAL GAME MODE
CHANCE GAME MODE
UNIT GAME
FIRST SYMBOL APPEARED
ENTER FROM THE NORMAL GAME MODE INTO THE CHANCE GAME MODE
UNIT GAME (FIRST)
DISCONTINUED SECOND SYMBOL APPEARED
UNIT GAME (SEVENTH)
RETURN FROM THE CHANCE GAME MODE TO THE NORMAL GAME MODE IF THE GAMES ARE EXECUTED UP TO THE SEVENTH GAME WITHOUT APPEARANCE OF THE SECOND SYMBOL
FIRST SESSION
CHANCE MODE EXECUTED IN A ROW
UNIT GAME (FIRST)
SECOND SESSION
DISCONTINUED SECOND SYMBOL APPEARED
UNIT GAME (SEVENTH)
CHANCE MODE EXECUTED IN A ROW
UNIT GAME (FIRST)
THIRD SESSION
UNIT GAME (SEVENTH)

FIG. 2

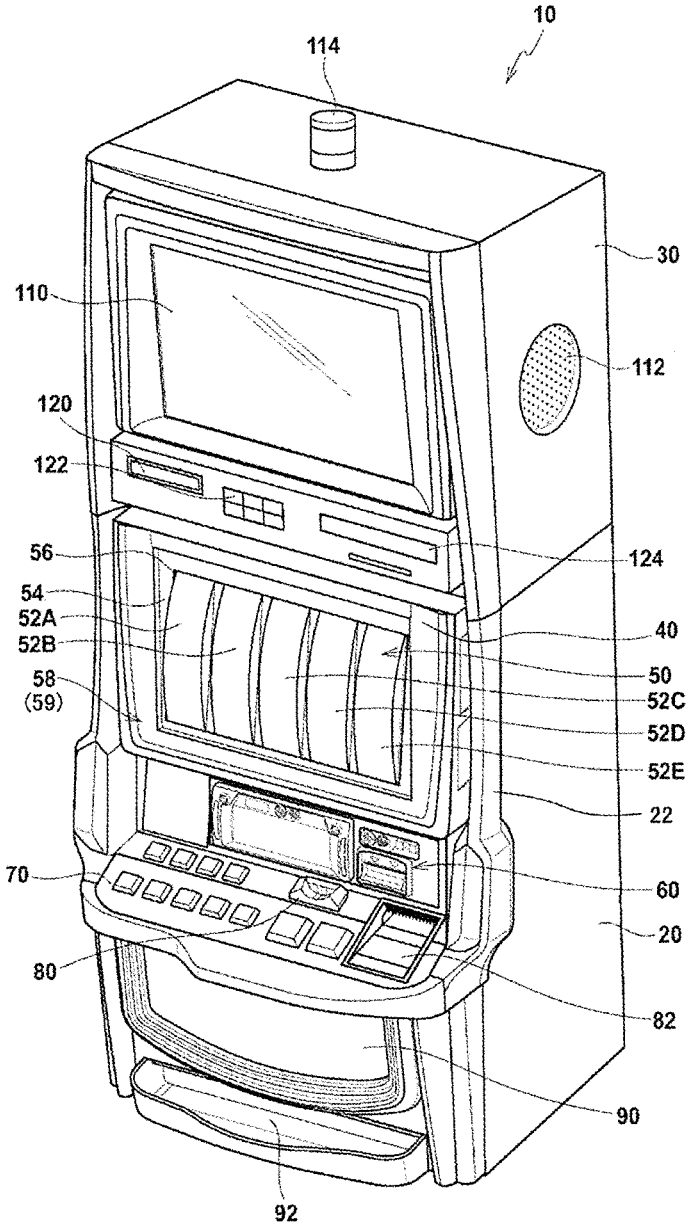

10
114
30
110
112
120
122
56
124
54
52A
52B
40
58
(59)
50
52C
52D
52E
22
70
60
20
80
82
90
92

FIG. 3

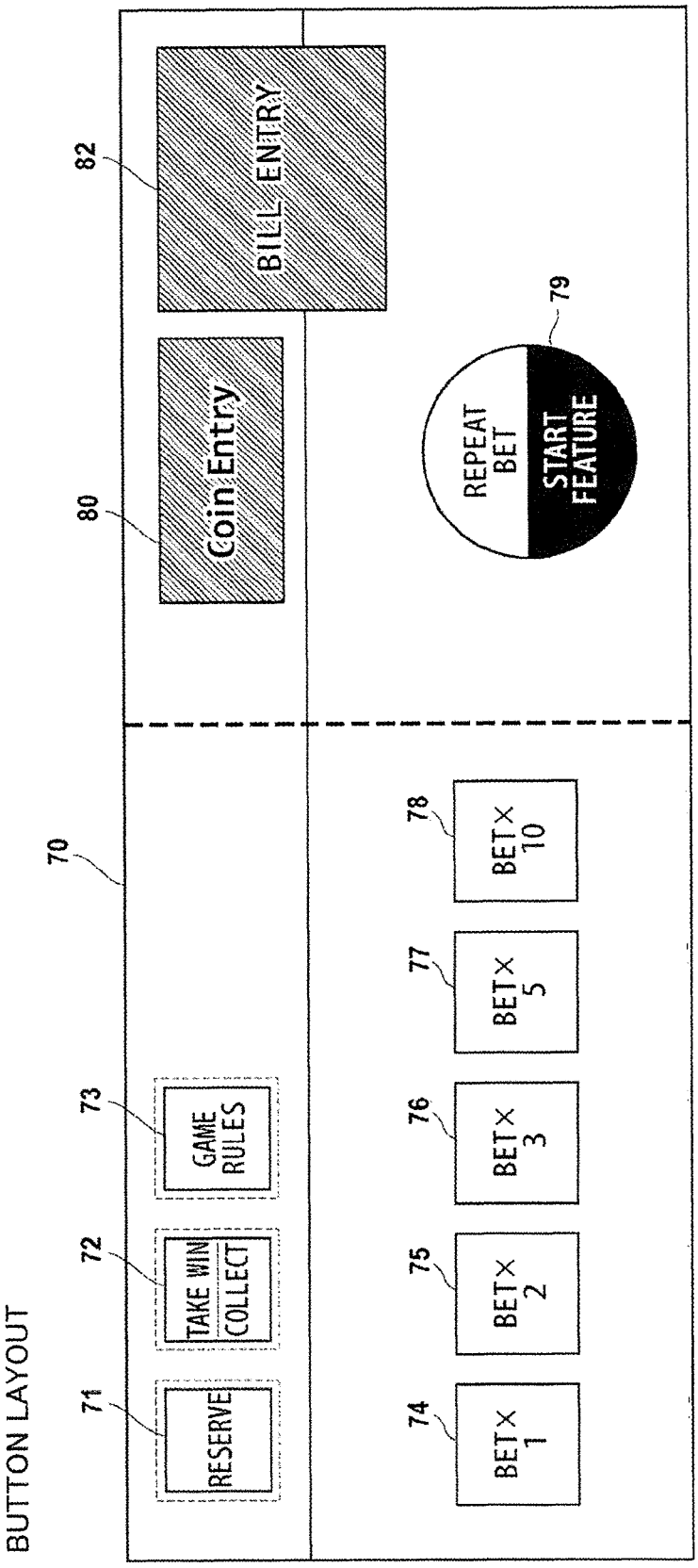

BUTTON LAYOUT
70
71
RESERVE
72
TAKE WIN
COLLECT
73
GAME RULES
74
BET X 1
75
BET X 2
76
BET X 3
77
BET X 5
78
BET X 10
79
REPEAT BET
START FEATURE
80
Coin Entry
82
BILL ENTRY

FIG. 4

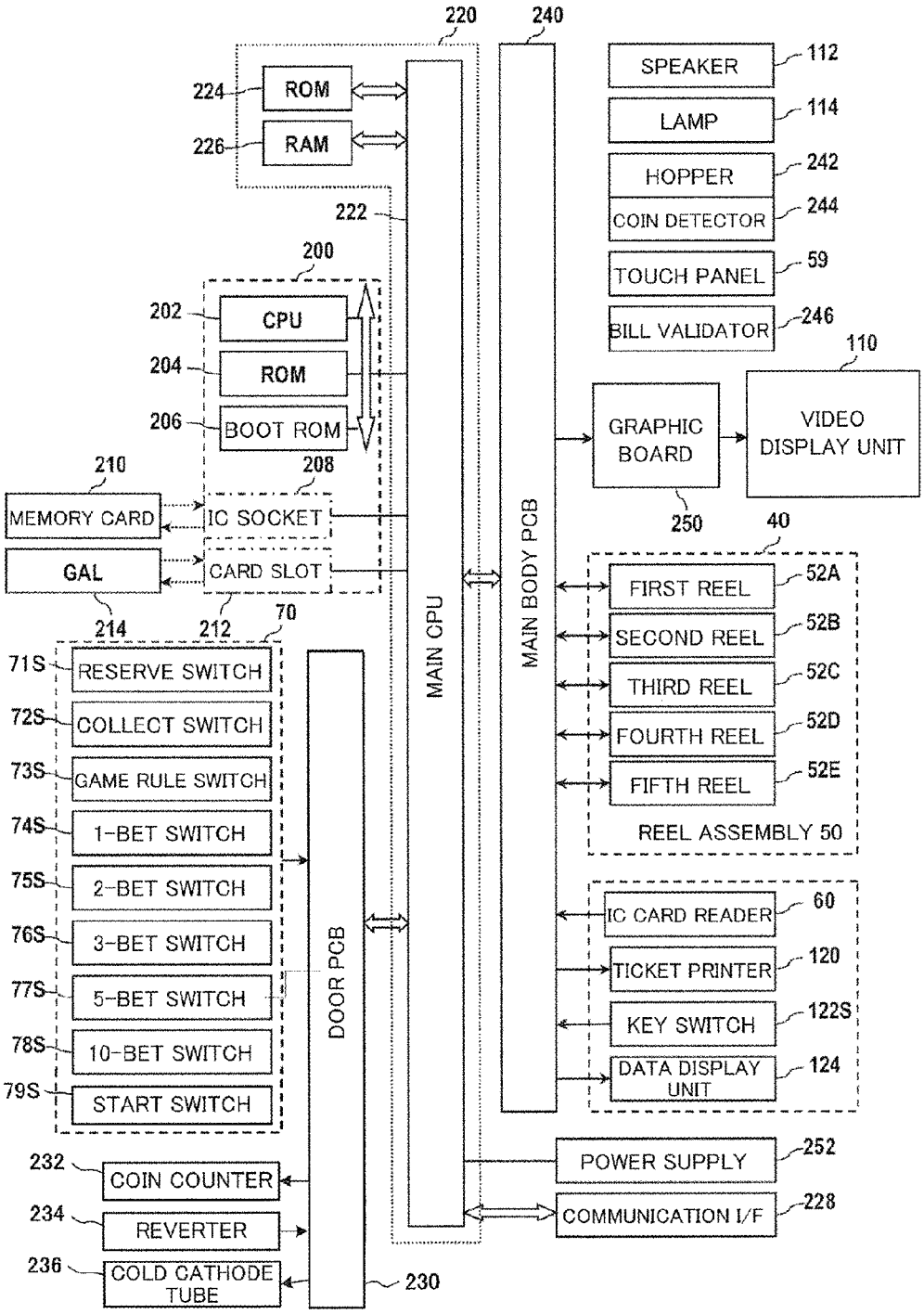

220
240
224
ROM
226
RAM
222
200
202
CPU
204
ROM
206
BOOT ROM
210
208
MEMORY CARD
IC SOCKET
GAL
CARD SLOT
214
212
70
71S
RESERVE SWITCH
72S
COLLECT SWITCH
73S
GAME RULE SWITCH
74S
1-BET SWITCH
75S
2-BET SWITCH
76S
3-BET SWITCH
77S
5-BET SWITCH
78S
10-BET SWITCH
79S
START SWITCH
DOOR PCB
MAIN CPU
MAIN BODY PCB
SPEAKER
112
LAMP
114
HOPPER
242
COIN DETECTOR
244
TOUCH PANEL
59
BILL VALIDATOR
246
110
GRAPHIC BOARD
VIDEO DISPLAY UNIT
250
40
FIRST REEL
52A
SECOND REEL
52B
THIRD REEL
52C
FOURTH REEL
52D
FIFTH REEL
52E
REEL ASSEMBLY 50
IC CARD READER
60
TICKET PRINTER
120
KEY SWITCH
122S
DATA DISPLAY UNIT
124
232
COIN COUNTER
234
REVERTER
236
COLD CATHODE TUBE
230
POWER SUPPLY
252
COMMUNICATION I/F
228

FIG. 5

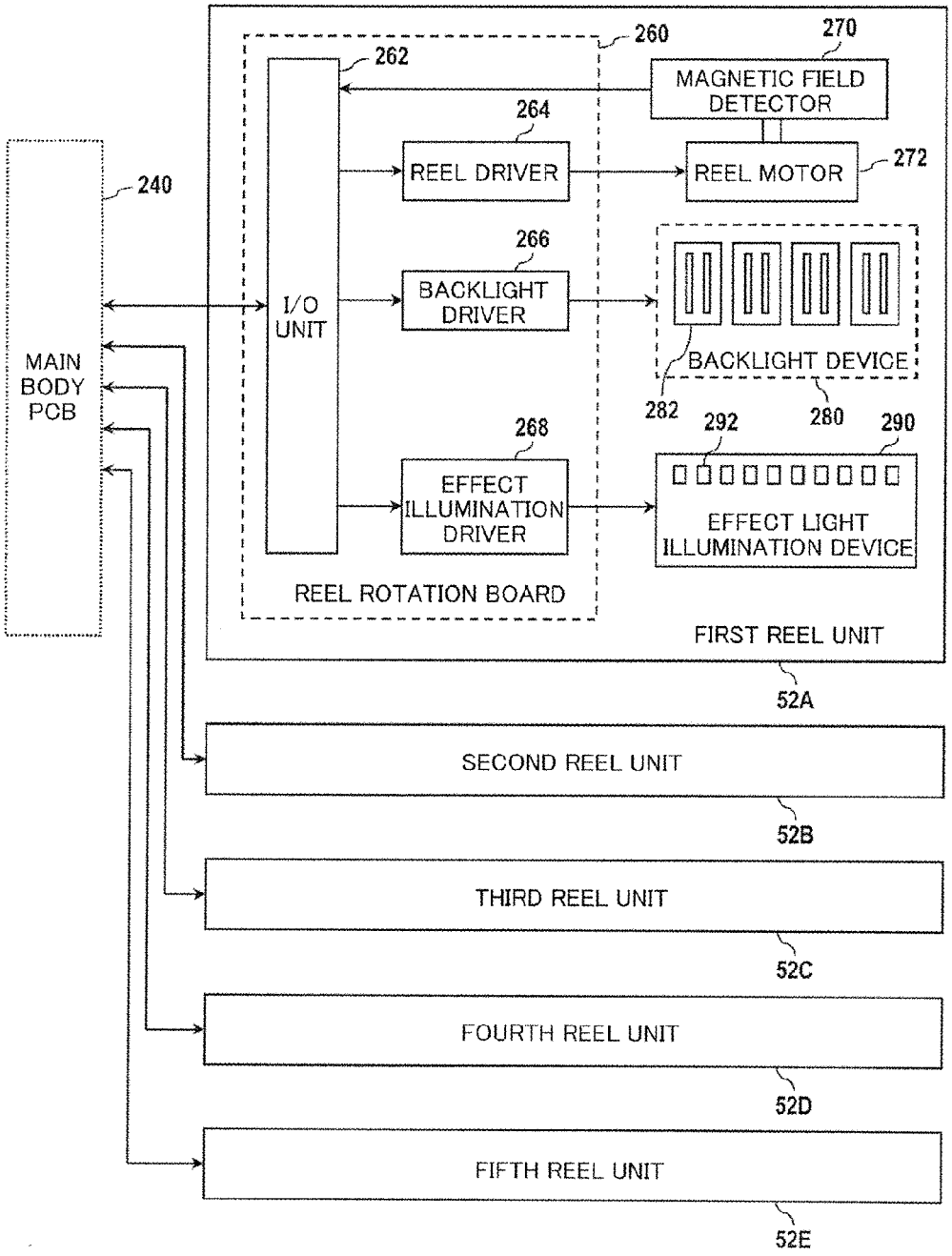

260
270
262
MAGNETIC FIELD DETECTOR
264
REEL DRIVER
REEL MOTOR
272
240
266
BACKLIGHT DRIVER
I/O UNIT
BACKLIGHT DEVICE
MAIN BODY PCB
282
292
280
290
268
EFFECT ILLUMINATION DRIVER
EFFECT LIGHT ILLUMINATION DEVICE
REEL ROTATION BOARD
FIRST REEL UNIT
52A
SECOND REEL UNIT
52B
THIRD REEL UNIT
52C
FOURTH REEL UNIT
52D
FIFTH REEL UNIT
52E

FIG. 6

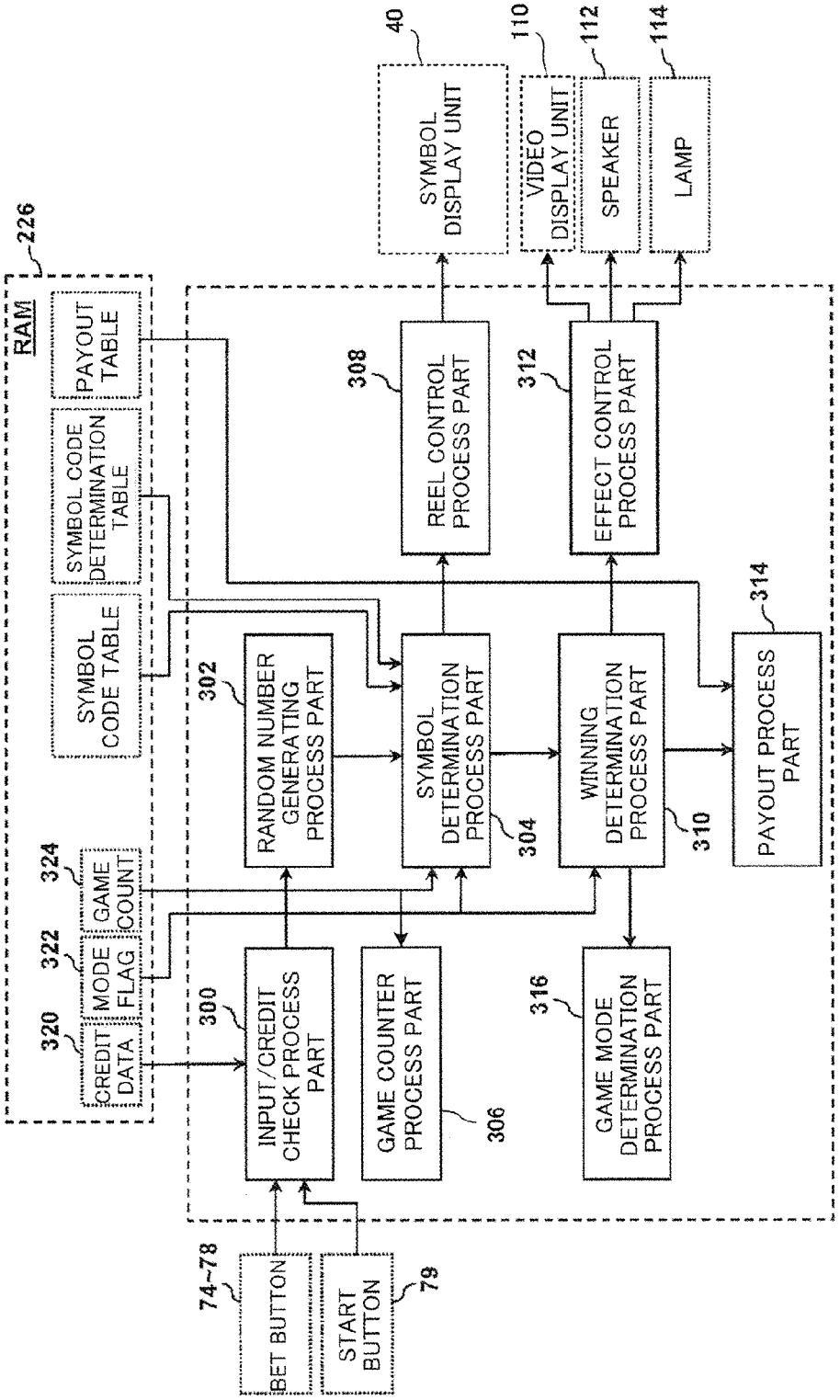

40
SYMBOL DISPLAY UNIT
110
VIDEO DISPLAY UNIT
112
SPEAKER
114
LAMP
226
RAM
PAYOUT TABLE
SYMBOL CODE DETERMINATION TABLE
SYMBOL CODE TABLE
308
REEL CONTROL PROCESS PART
312
EFFECT CONTROL PROCESS PART
302
RANDOM NUMBER GENERATING PROCESS PART
SYMBOL DETERMINATION PROCESS PART
304
WINNING DETERMINATION PROCESS PART
310
314
PAYOUT PROCESS PART
324
GAME COUNT
322
MODE FLAG
320
CREDIT DATA
300
INPUT/CREDIT CHECK PROCESS PART
GAME COUNTER PROCESS PART
306
316
GAME MODE DETERMINATION PROCESS PART
74-78
BET BUTTON
START BUTTON
79

FIG. 7

SYMBOL CODE TABLE

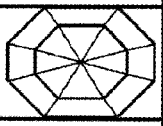
SYMBOL CODE	FIRST COLUMN	SECOND COLUMN	THIRD COLUMN	FOURTH COLUMN	FIFTH COLUMN
00					
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					

FIG. 8

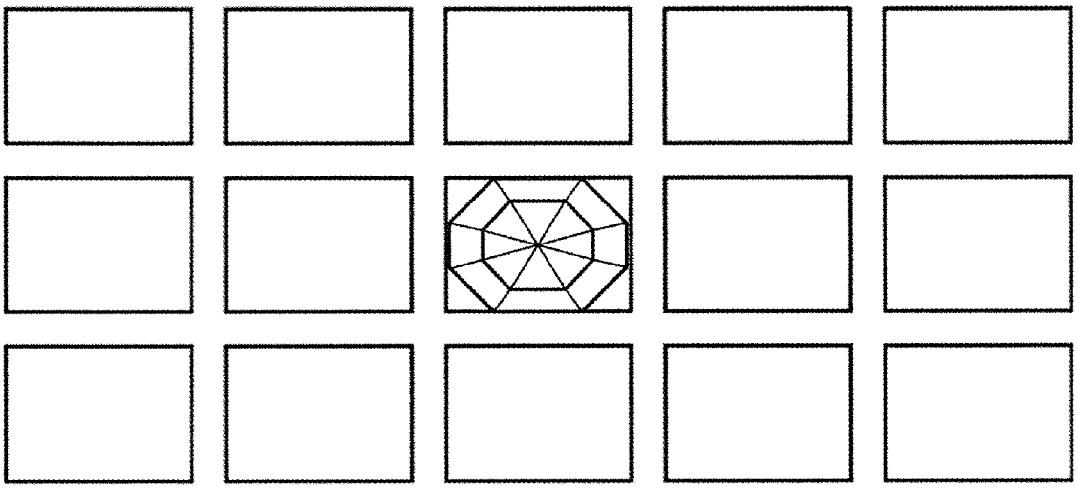
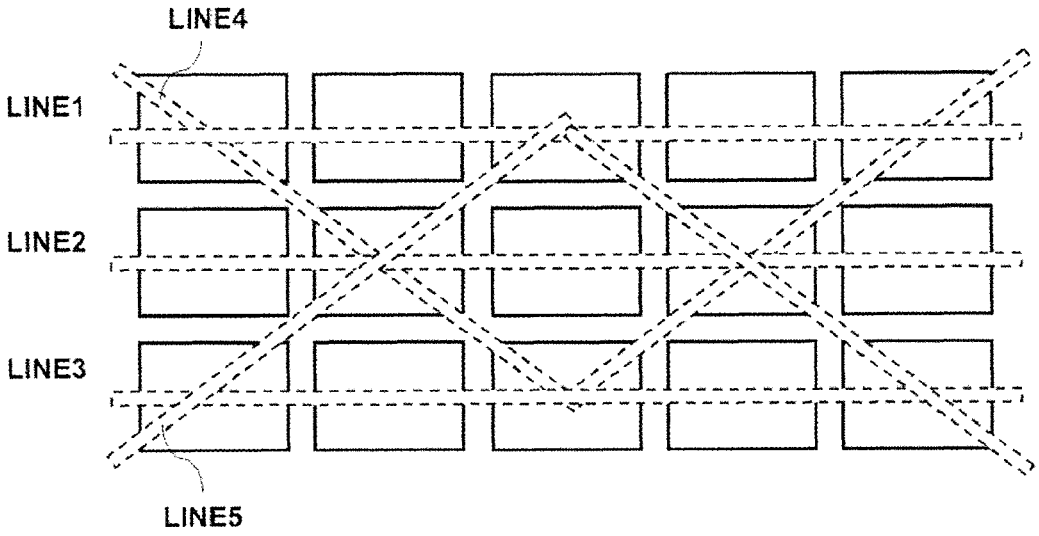


FIG. 9



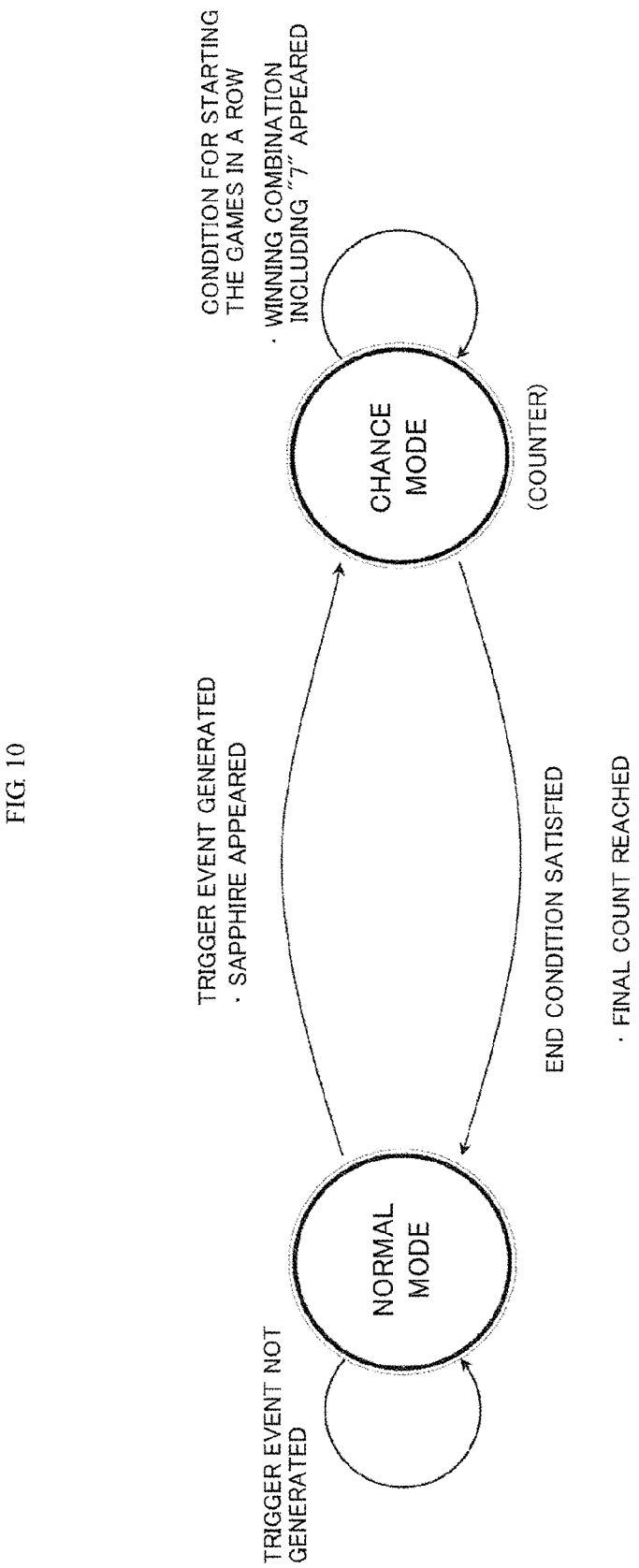

CONDITION FOR STARTING THE GAMES IN A ROW
· WINNING COMBINATION INCLUDING "7" APPEARED
CHANCE MODE
(COUNTER)
TRIGGER EVENT GENERATED
· SAPPHIRE APPEARED
END CONDITION SATISFIED
· FINAL COUNT REACHED
NORMAL MODE
TRIGGER EVENT NOT GENERATED

FIG. 10

FIG. 11

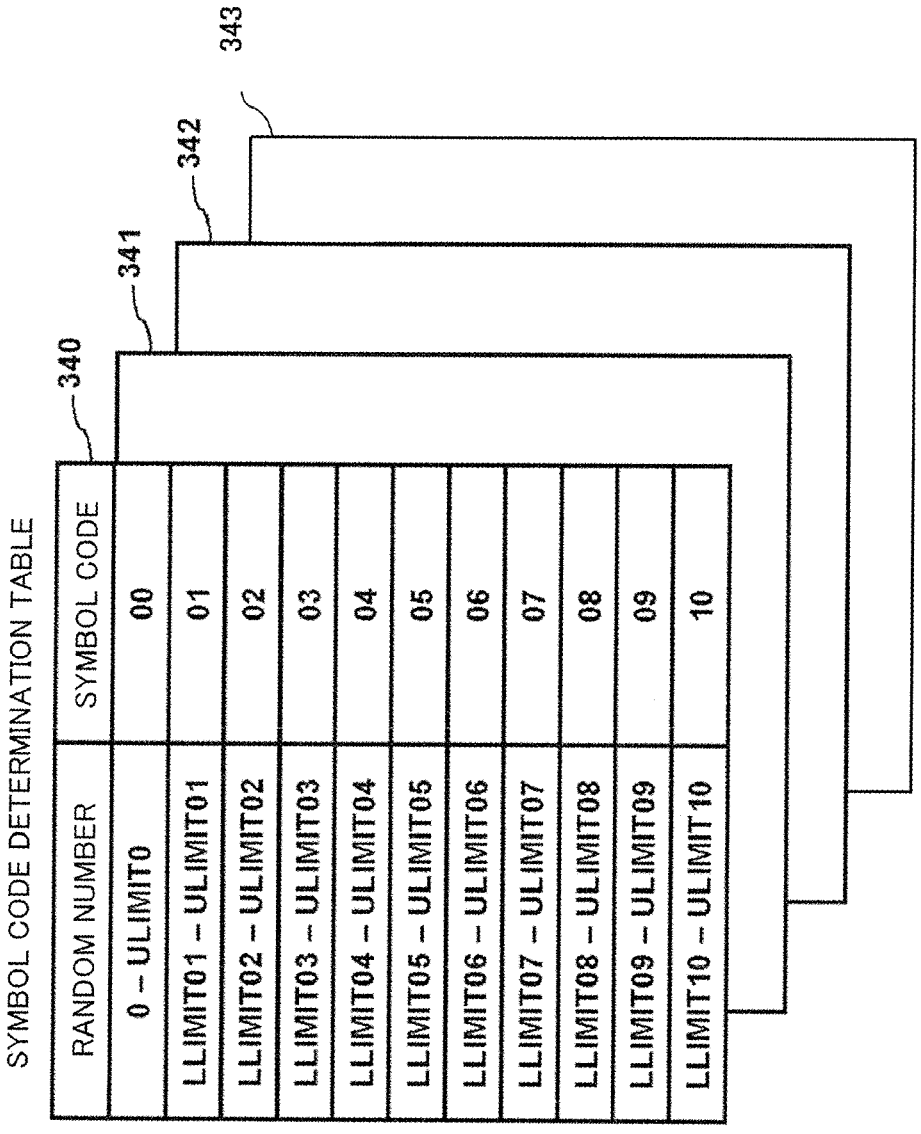
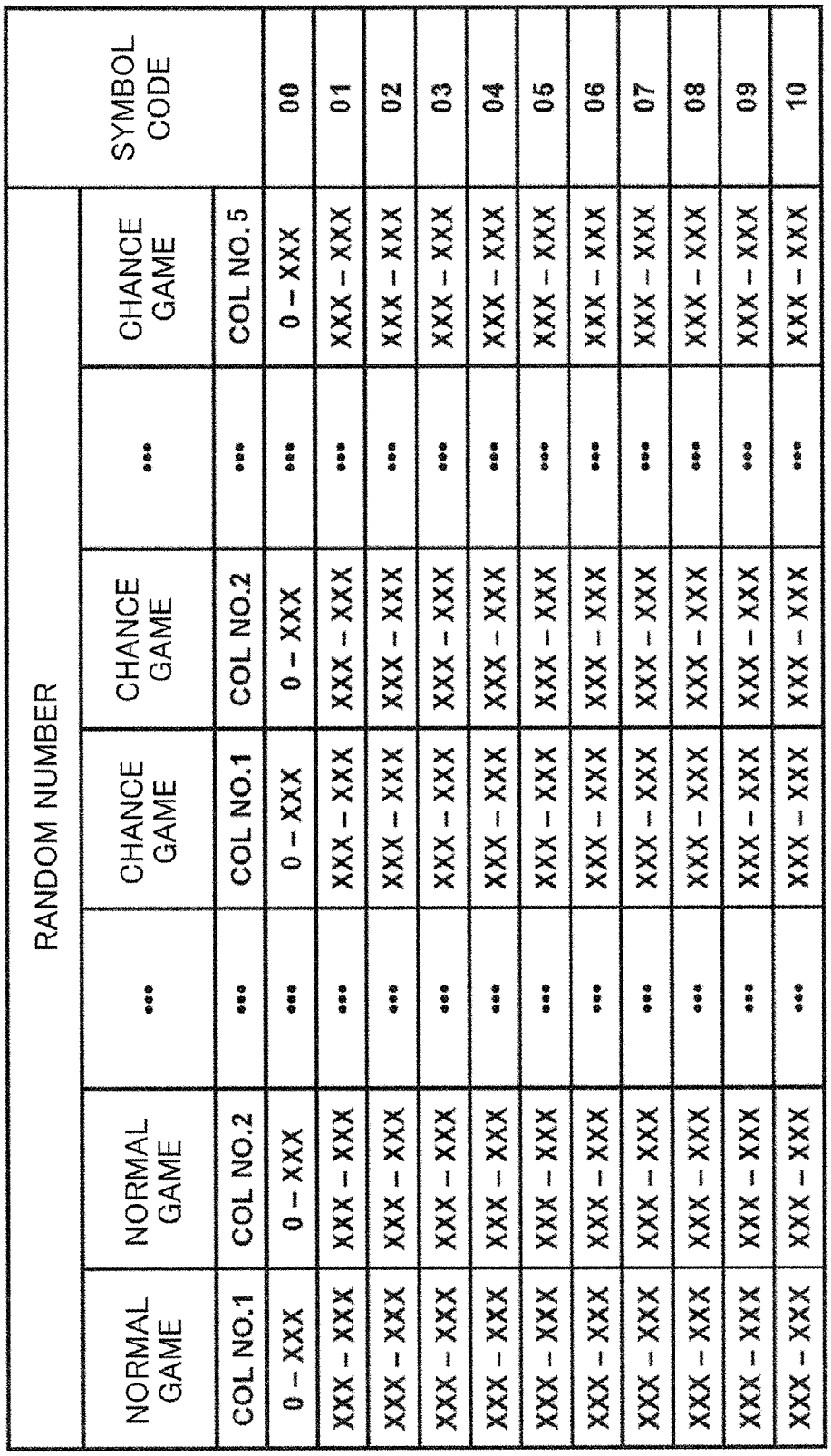

SYMBOL CODE DETERMINATION TABLE
340
341
342
343
RANDOM NUMBER
SYMBOL CODE
0 – ULIMIT0
00
LLIMIT01 – ULIMIT01
01
LLIMIT02 – ULIMIT02
02
LLIMIT03 – ULIMIT03
03
LLIMIT04 – ULIMIT04
04
LLIMIT05 – ULIMIT05
05
LLIMIT06 – ULIMIT06
06
LLIMIT07 – ULIMIT07
07
LLIMIT08 – ULIMIT08
08
LLIMIT09 – ULIMIT09
09
LLIMIT10 – ULIMIT10
10

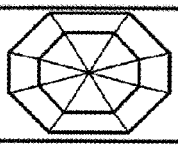
FIG. 12



RANDOM NUMBER							SYMBOL CODE
NORMAL GAME	NORMAL GAME	...	CHANCE GAME	CHANCE GAME	...	CHANCE GAME	
COL NO.1	COL NO.2	...	COL NO.1	COL NO.2	...	COL NO.5	
0 – XXX	0 – XXX	...	0 – XXX	0 – XXX	...	0 – XXX	00
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	01
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	02
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	03
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	04
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	05
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	06
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	07
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	08
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	09
XXX – XXX	XXX – XXX	...	XXX – XXX	XXX – XXX	...	XXX – XXX	10

FIG. 13

SYMBOL APPEARANCE PROBABILITY TABLE

SYMBOL	PROBABILITY
	1 / XXX
	1 / XXX
	1 / XXX
	1 / XXX
	1 / XXX
	1 / XXX

360

361

363

FIG. 14

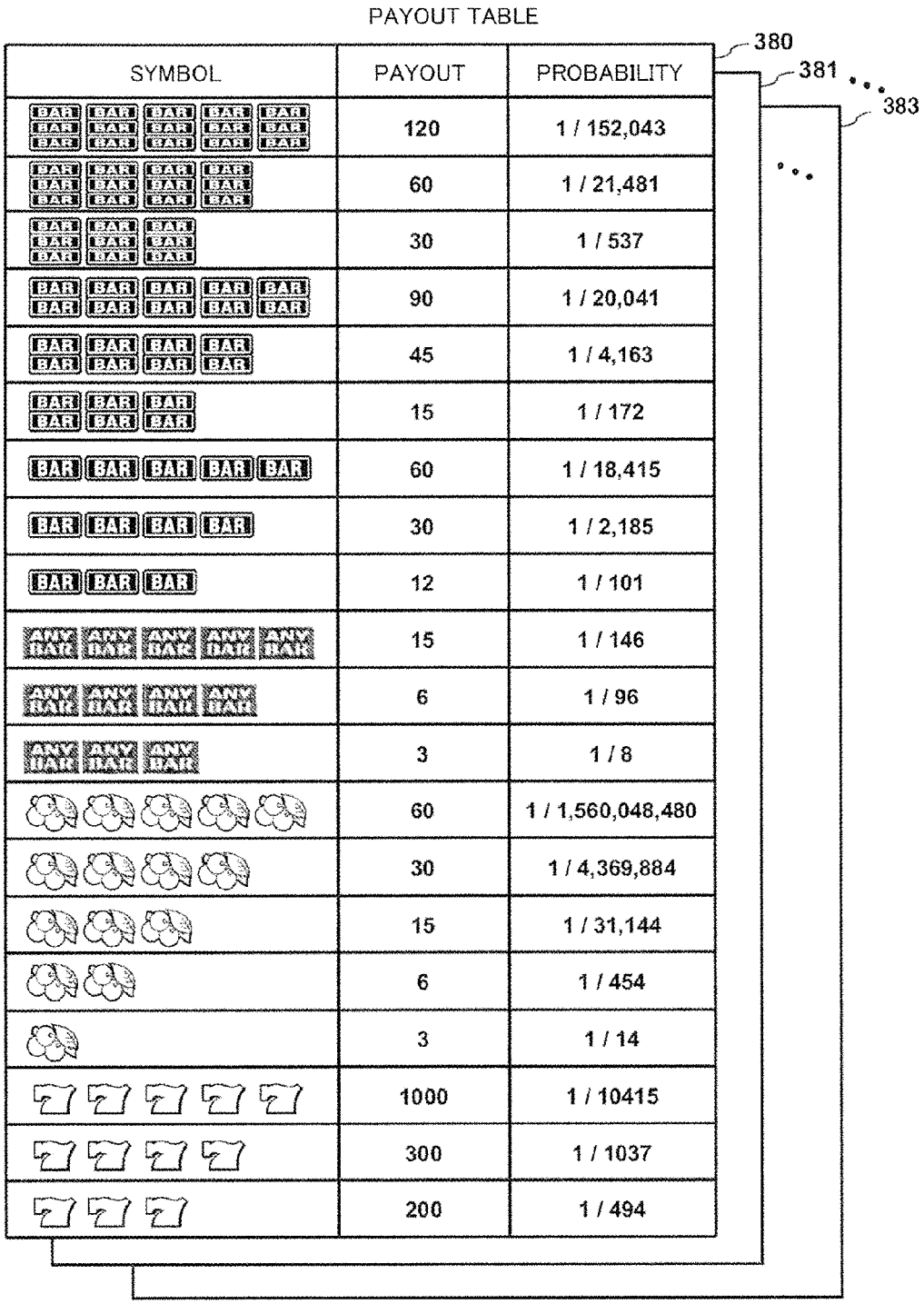

PAYOUT TABLE
380
381
383
SYMBOL
PAYOUT
PROBABILITY
120
1 / 152,043
60
1 / 21,481
30
1 / 537
90
1 / 20,041
45
1 / 4,163
15
1 / 172
60
1 / 18,415
30
1 / 2,185
12
1 / 101
15
1 / 146
6
1 / 96
3
1 / 8
60
1 / 1,560,048,480
30
1 / 4,369,884
15
1 / 31,144
6
1 / 454
3
1 / 14
1000
1 / 10415
300
1 / 1037
200
1 / 494

FIG. 15

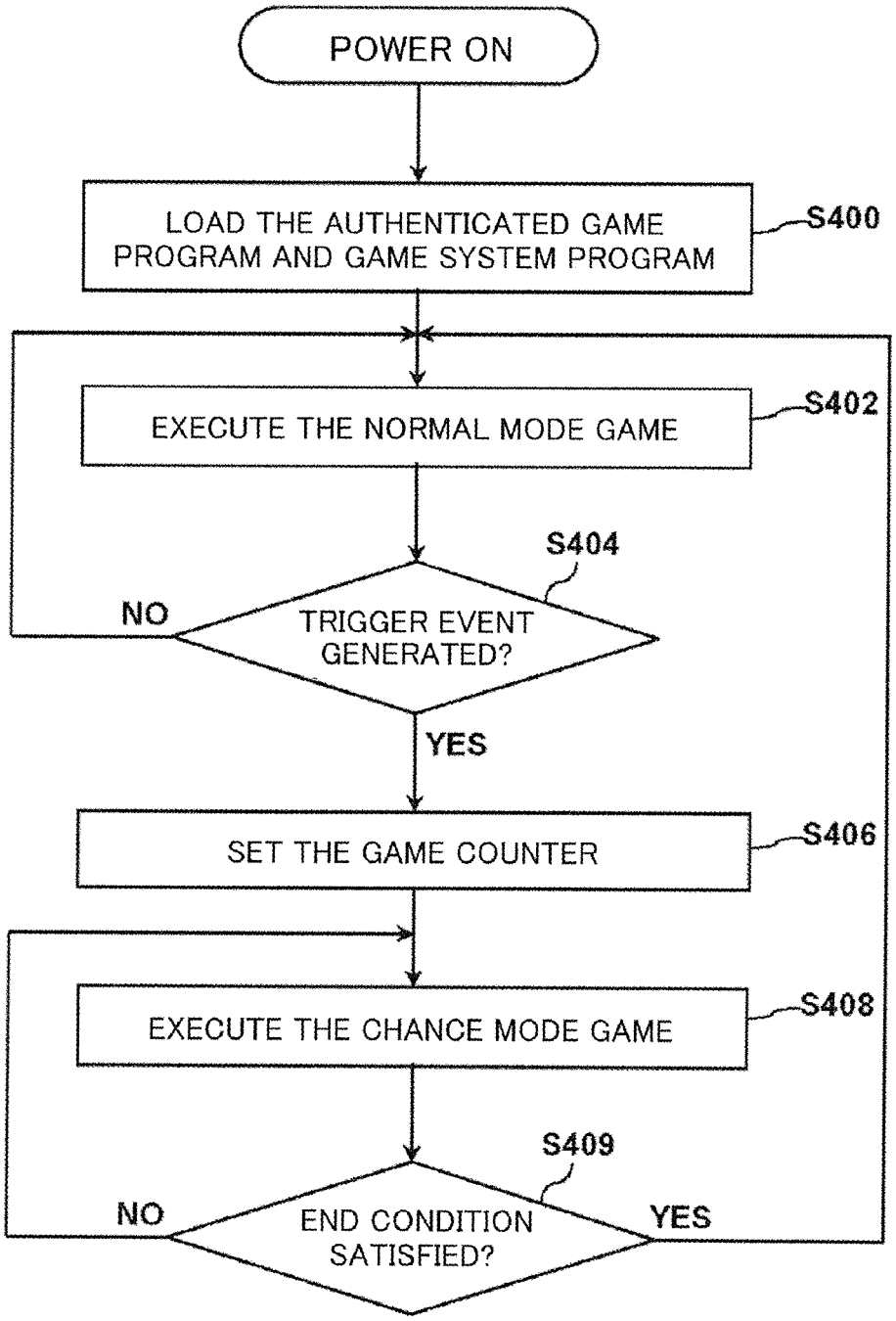

POWER ON
LOAD THE AUTHENTICATED GAME PROGRAM AND GAME SYSTEM PROGRAM
S400
EXECUTE THE NORMAL MODE GAME
S402
S404
TRIGGER EVENT GENERATED?
NO
YES
SET THE GAME COUNTER
S406
EXECUTE THE CHANCE MODE GAME
S408
S409
END CONDITION SATISFIED?
NO
YES

FIG. 16

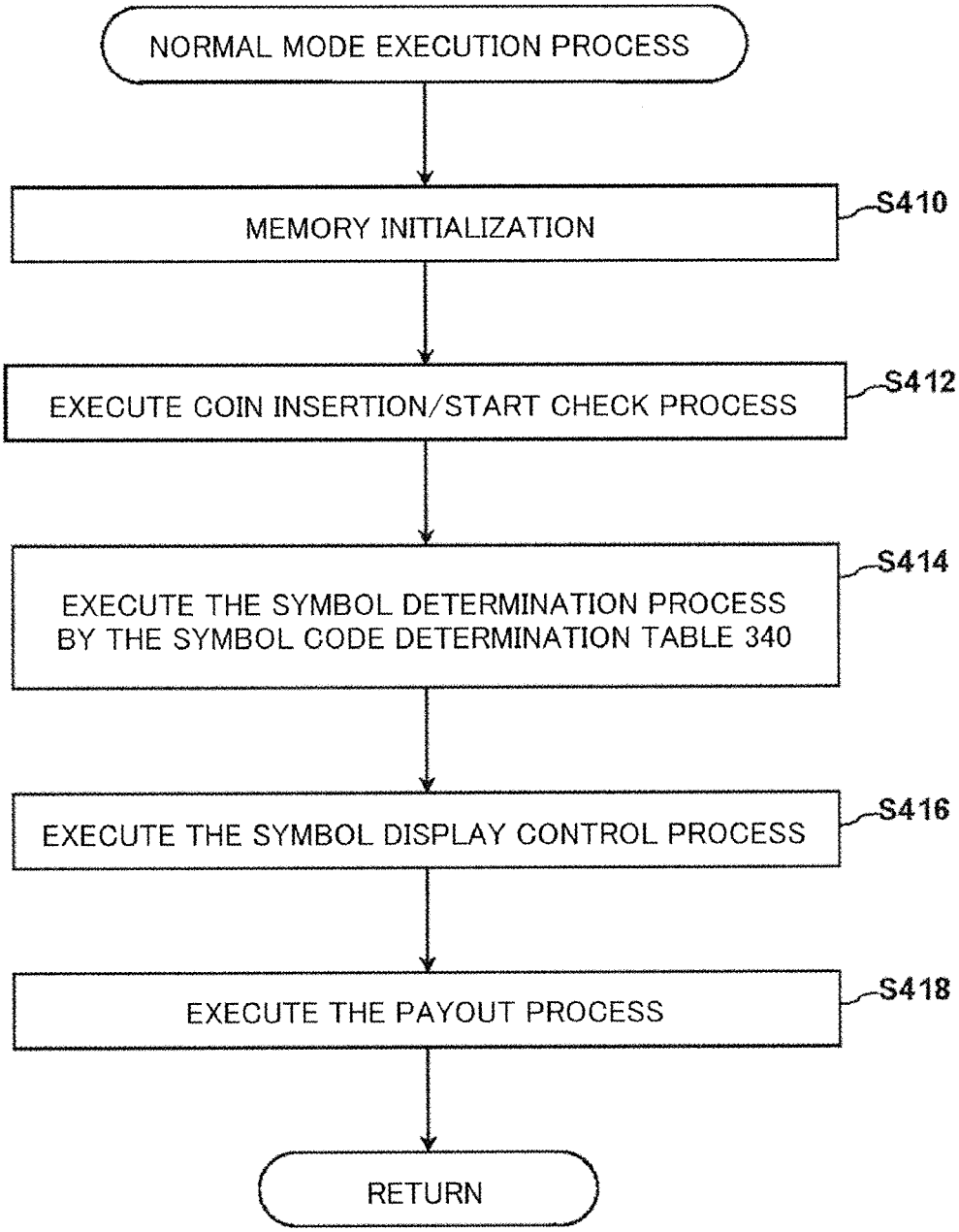

NORMAL MODE EXECUTION PROCESS
MEMORY INITIALIZATION
S410
EXECUTE COIN INSERTION/START CHECK PROCESS
S412
EXECUTE THE SYMBOL DETERMINATION PROCESS BY THE SYMBOL CODE DETERMINATION TABLE 340
S414
EXECUTE THE SYMBOL DISPLAY CONTROL PROCESS
S416
EXECUTE THE PAYOUT PROCESS
S418
RETURN

FIG. 17

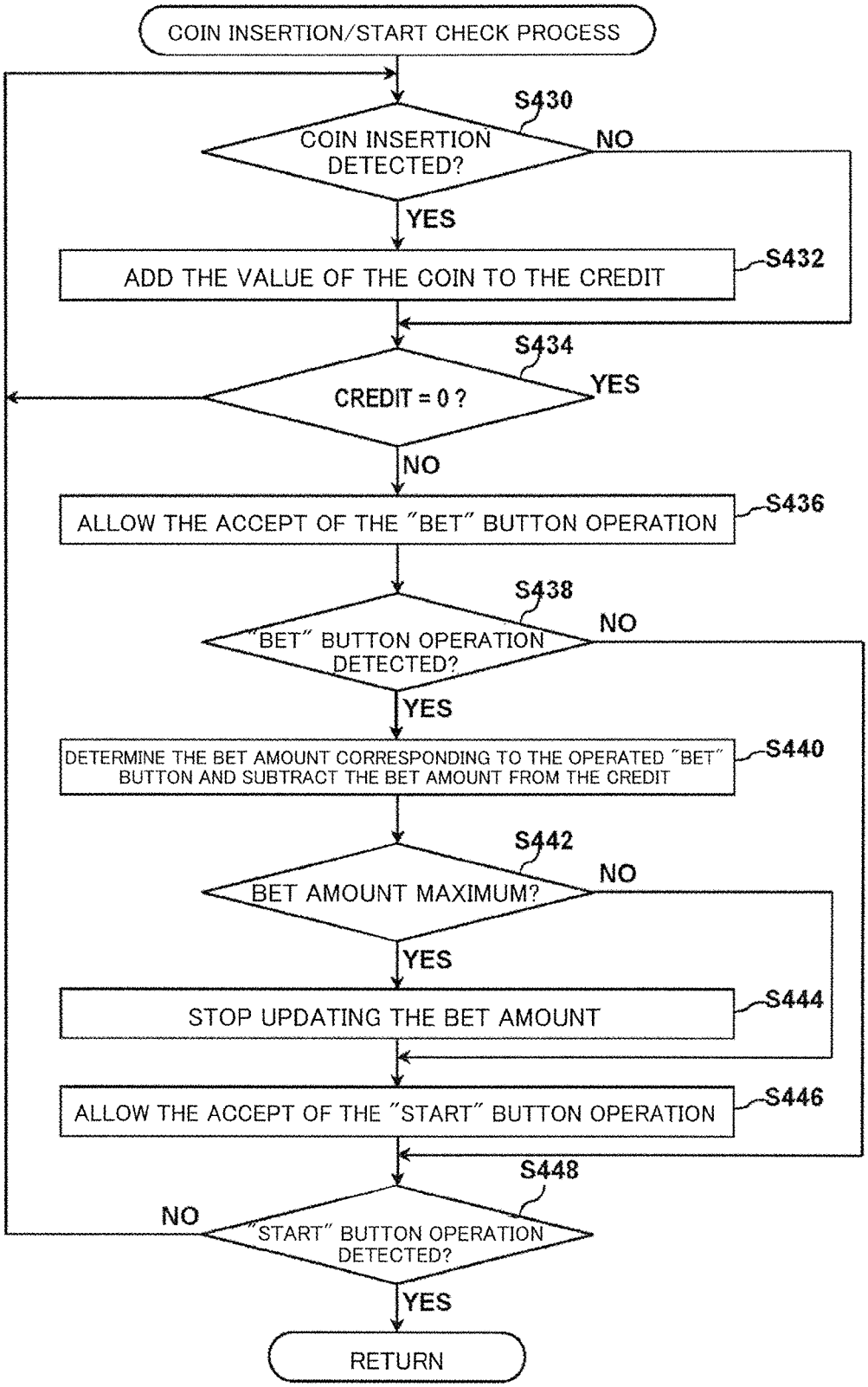

COIN INSERTION/START CHECK PROCESS
S430
COIN INSERTION DETECTED?
NO
YES
ADD THE VALUE OF THE COIN TO THE CREDIT
S432
S434
CREDIT = 0 ?
YES
NO
ALLOW THE ACCEPT OF THE "BET" BUTTON OPERATION
S436
S438
"BET" BUTTON OPERATION DETECTED?
NO
YES
DETERMINE THE BET AMOUNT CORRESPONDING TO THE OPERATED "BET" BUTTON AND SUBTRACT THE BET AMOUNT FROM THE CREDIT
S440
S442
BET AMOUNT MAXIMUM?
NO
YES
STOP UPDATING THE BET AMOUNT
S444
ALLOW THE ACCEPT OF THE "START" BUTTON OPERATION
S446
S448
NO
"START" BUTTON OPERATION DETECTED?
YES
RETURN

FIG. 18

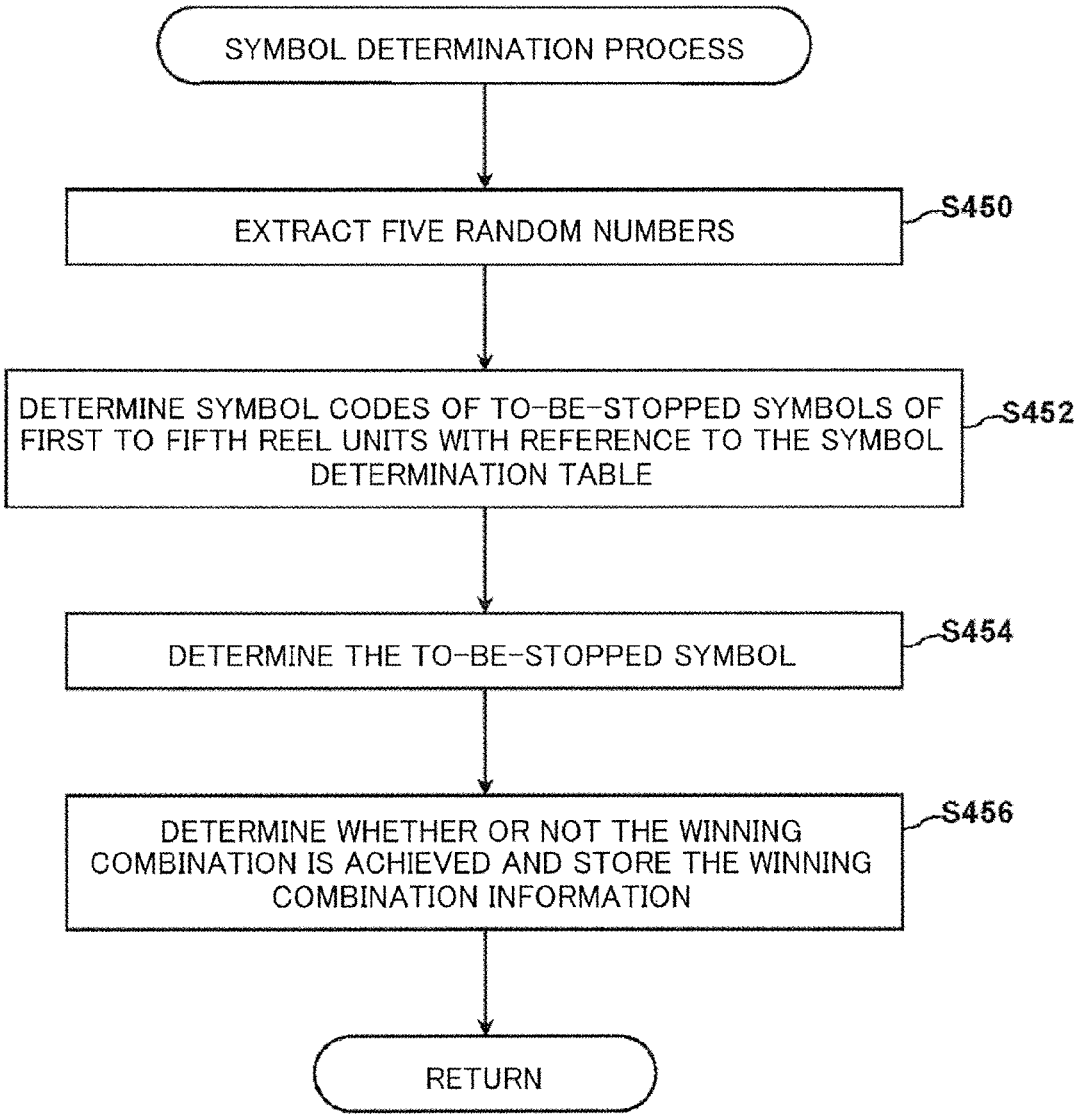

SYMBOL DETERMINATION PROCESS
EXTRACT FIVE RANDOM NUMBERS
S450
DETERMINE SYMBOL CODES OF TO-BE-STOPPED SYMBOLS OF FIRST TO FIFTH REEL UNITS WITH REFERENCE TO THE SYMBOL DETERMINATION TABLE
S452
DETERMINE THE TO-BE-STOPPED SYMBOL
S454
DETERMINE WHETHER OR NOT THE WINNING COMBINATION IS ACHIEVED AND STORE THE WINNING COMBINATION INFORMATION
S456
RETURN

FIG. 19

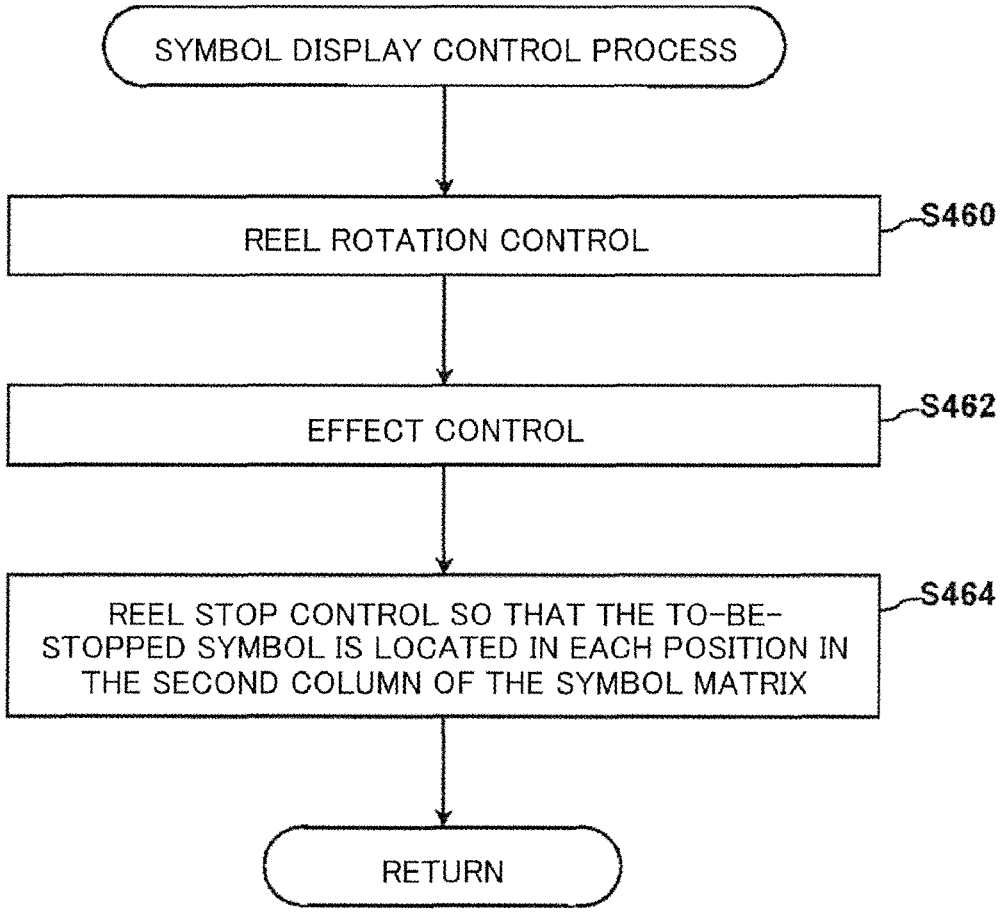

SYMBOL DISPLAY CONTROL PROCESS
REEL ROTATION CONTROL
S460
EFFECT CONTROL
S462
REEL STOP CONTROL SO THAT THE TO-BE-STOPPED SYMBOL IS LOCATED IN EACH POSITION IN THE SECOND COLUMN OF THE SYMBOL MATRIX
S464
RETURN

FIG. 20

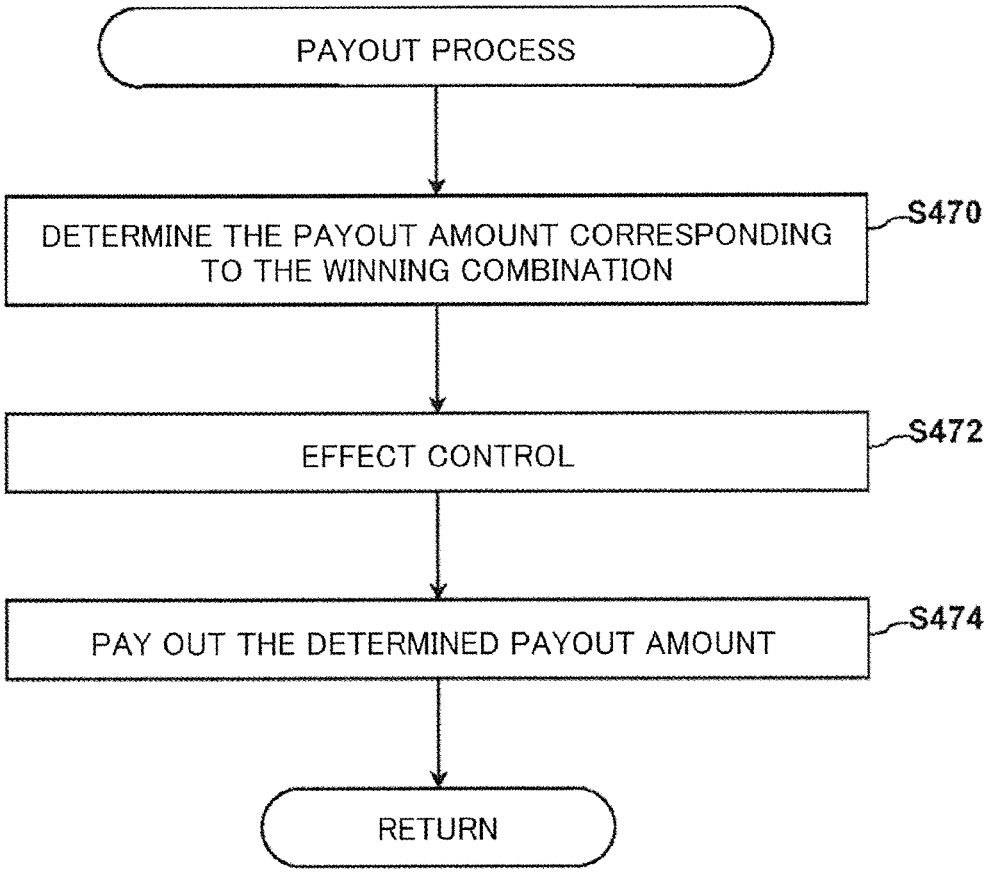

PAYOUT PROCESS
DETERMINE THE PAYOUT AMOUNT CORRESPONDING TO THE WINNING COMBINATION
S470
EFFECT CONTROL
S472
PAY OUT THE DETERMINED PAYOUT AMOUNT
S474
RETURN

FIG. 21

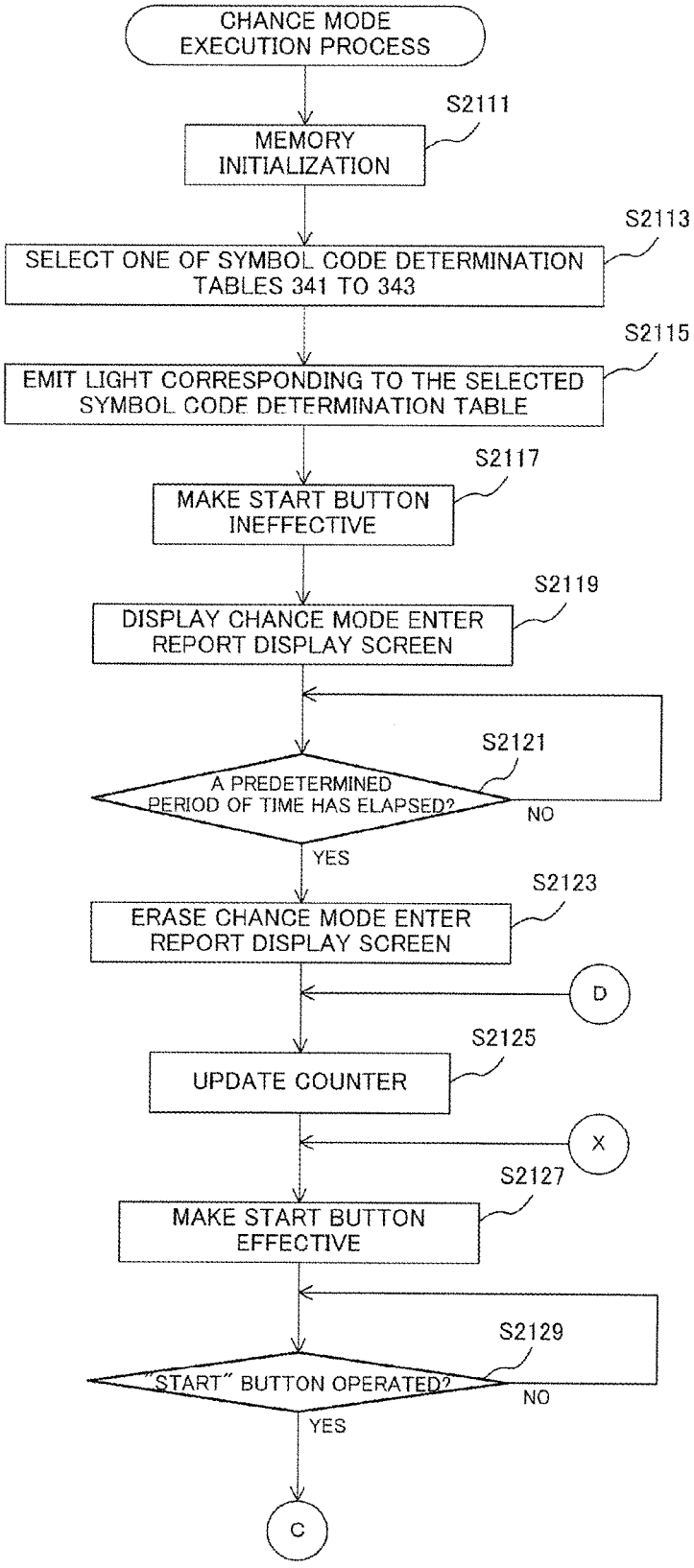
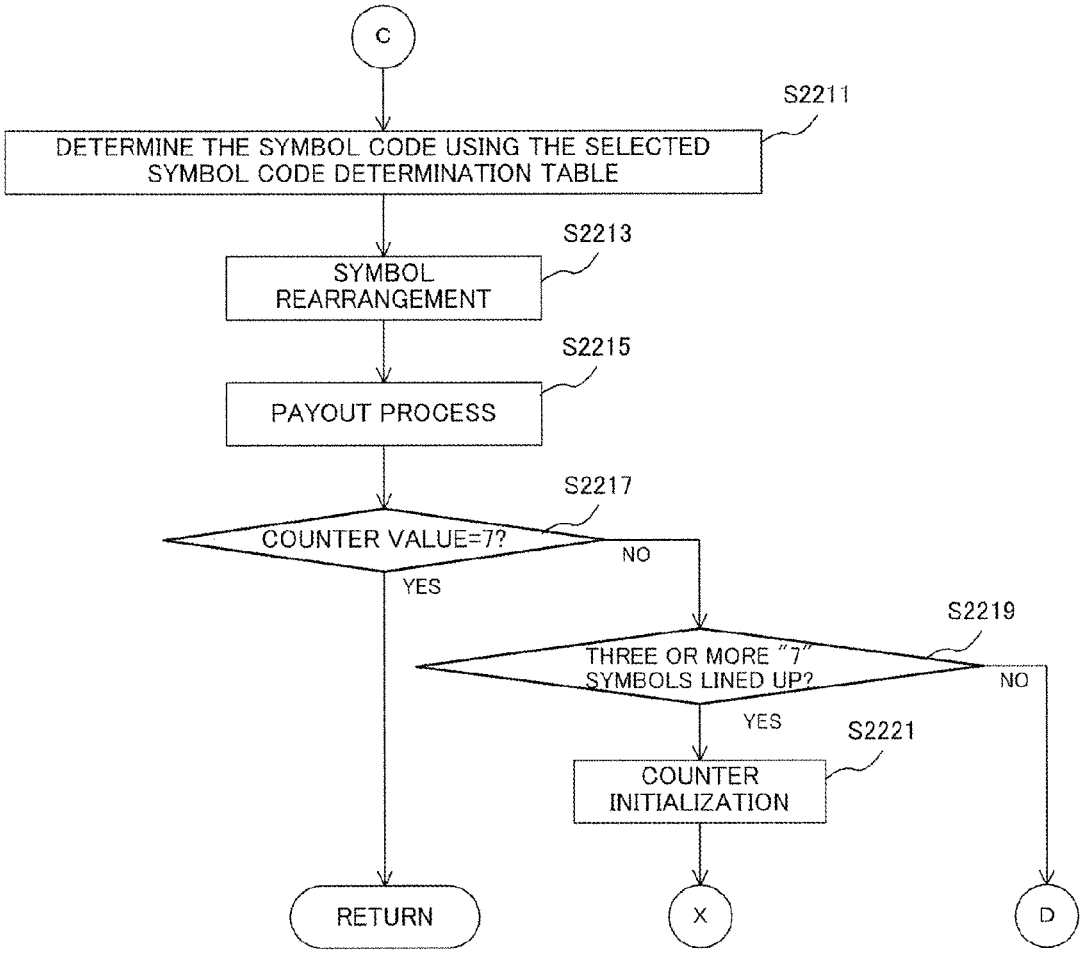

CHANCE MODE EXECUTION PROCESS
S2111
MEMORY INITIALIZATION
S2113
SELECT ONE OF SYMBOL CODE DETERMINATION TABLES 341 TO 343
S2115
EMIT LIGHT CORRESPONDING TO THE SELECTED SYMBOL CODE DETERMINATION TABLE
S2117
MAKE START BUTTON INEFFECTIVE
S2119
DISPLAY CHANCE MODE ENTER REPORT DISPLAY SCREEN
S2121
A PREDETERMINED PERIOD OF TIME HAS ELAPSED?
NO
YES
S2123
ERASE CHANCE MODE ENTER REPORT DISPLAY SCREEN
D
S2125
UPDATE COUNTER
X
S2127
MAKE START BUTTON EFFECTIVE
S2129
"START" BUTTON OPERATED?
NO
YES
C

FIG. 22


C
S2211
DETERMINE THE SYMBOL CODE USING THE SELECTED SYMBOL CODE DETERMINATION TABLE
S2213
SYMBOL REARRANGEMENT
S2215
PAYOUT PROCESS
S2217
COUNTER VALUE=7?
NO
YES
S2219
THREE OR MORE "7" SYMBOLS LINED UP?
NO
YES
S2221
COUNTER INITIALIZATION
RETURN
X
D

GAMING MACHINE HAVING NORMAL GAME MODE AND CHANCE GAME MODE

CROSS REFERENCE TO RELATED APPLICATIONS

This application claims priority of Japanese Patent Application No. 2012-108157 filed on May 10, 2012. The contents of this application are incorporated herein by reference in their entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a gaming machine and, more particularly, to a gaming machine which rearranges symbols in each of unit games and awards a benefit when a winning pattern is established in the rearranged symbols.

2. Description of the Related Art

A slot machine is a gaming machine that rotates reels to rearrange symbols in a display area each time a game player presses a button located on a control panel to start playing a unit game. When a winning pattern is formed in the display area, a benefit (e.g., a payout) is awarded to the player (for example, refer to U.S. Pat. No. 4,097,048).

In consideration of players' diversified preferences, there have been developed a variety of slot machines. For example, the slot machines has been developed which varies in symbol patterns, gaming scenarios, side effects (sound effects, effects using images, and effects by means of reel spinning). Moreover, the slot machine has been developed which is provided with a bonus game (for example, refer to U.S. Pat. No. 4,508,345). Furthermore, the slot machine also has been developed which permits the enjoyment of a free game under predetermined conditions (for example, refer to U.S. Pat. No. 7,942,733).

Furthermore, there also have been developed the slot machine that allows the player to access television program, web sites, or pay-per-view services (for example, refer to U.S. Pat. No. 7,871,327).

Yet further, there has been conventionally a gaming machine which adds further free games when a predetermined condition is established in a free game mode. This enables a player to play extra free games in a row, and thus more benefits have been able to given to a player.

SUMMARY OF THE INVENTION

However, since extra free games are added each time the predetermined condition is established, the number of free games resultingly increases. Thus, the games proceed monotonously, which undermines a player's feeling of tension and makes a player bored in the meantime. Furthermore, increase in the number of free games creates the tendency of reduction in consumption of gaming media, so that the benefit of a casino might be affected. Therefore, the gaming machine has been desired which can provide games that are prevented from progressing monotonously, and thus can provide a player with a feeling of tension.

In light of the above-mentioned issues, the present invention is made, and the purpose thereof is to provide a gaming machine which can provide games that are prevented from progressing monotonously, and thus can provide a player with a feeling of tension, thereby facilitating the consumption of more gaming media.

A feature of the present invention is a gaming machine capable of obtaining a game result based on a plurality of rearranged symbols, including:

a symbol display unit for rearranging the plurality of symbols;

a memory having a first symbol determination table for causing a first symbol to appear on the symbol display unit in a normal game mode with a first probability, the normal game mode being to execute a normal mode game, and a second symbol determination table for causing a second symbol to appear on the symbol display unit in a chance game mode with a second probability, the chance game mode being to execute a chance game; and

a controller for executing processes of:

(1-1) entering the mode into the chance game mode under the condition that a first symbol appears on a symbol display unit in the normal game mode;

(1-2) terminating the chance game mode under the condition that the number of games reaches a predetermined number in the chance game mode; and

(1-3) discontinuing the currently played chance game and starting afresh the chance game from the first game under the condition that a second symbol appears on the symbol display unit upon the number of games being less than a predetermined number in the chance game mode.

In this way, a chance game is started afresh from a first game, and thus simply adding more chance mode games is avoided. It is thus possible to provide the game that is prevented from progressing monotonously and provide a player with a feeling of tension. Furthermore, since the number of times of chance games can be limited, returning to the normal mode game can facilitate the consumption of more gaming media.

In addition to the above, a feature of the present invention is to include the second symbol determination table including a plurality of determination tables having the second probabilities different from one another; and

the process (1-1) including the process of:

(1-1-1) selecting a determination table from among the plurality of determination tables at random.

In this way, it is possible to adjust the degree of achievement of chance games in a row.

Furthermore, a feature of the present invention is to include the process (1-1) including the process of:

(1-1-2) reporting information on a determination table selected at the process (1-1-1).

In this way, a player can recognize the degree of achievement of chance games in a row.

A feature of the present invention is a gaming machine capable of obtaining a game result based on a plurality of rearranged symbols, comprising:

a symbol display unit for rearranging the plurality of symbols;

a memory having a first symbol determination table for causing a first symbol to appear on the symbol display unit in a normal game mode with a first probability, the normal game mode being to execute a normal mode game, and a plurality of second symbol determination tables for causing a second symbol to appear on the symbol display unit in a chance mode with a second probability, the plurality of second symbol determination tables having the second probabilities different from one another, and the chance game mode being to execute a chance game; and

a controller for executing processes of:

(1-1) entering the mode into the chance game mode under the condition that a first symbol appears on a symbol display unit in the normal game mode;

(1-2) selecting a second determination table from among the plurality of second symbol code determination tables at random upon entering the mode into the chance game mode;

(1-3) reporting information on one of the second determination tables selected at the process (1-2);

(1-4) initializing the number of games of the chance games upon entering the mode into the chance game mode;

(1-5) starting the chance game from the first game;

(1-6) counting the number of games of the executed chance games;

(1-7) terminating the chance game mode under the condition that the number of games reaches a predetermined number in the chance game mode;

(1-8) discontinuing the currently played chance game under the condition that a second symbol appears on the symbol display unit upon the number of games being less than a predetermined number in the chance game mode;

(1-9) initializing the number of the games of the chance games after executing the process (1-8); and

(1-10) returning the process to the process (1-4) after executing the process (1-9).

In this way, a chance game is started afresh from a first game, and thus simply adding more chance mode games is avoided. It is thus possible to provide the game that is prevented from progressing monotonously and provide a player with a feeling of tension. Furthermore, the number of chance games can be limited, and thus returning to a normal mode game can facilitate the consumption of more gaming media.

It is possible to provide a gaming machine which can provide games that are prevented from progressing monotonously so as to provide a player with a feeling of tension, thereby facilitating the consumption of more gaming media.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a diagram showing an overview of a gaming machine according to an embodiment of the present invention.

FIG. **2** is a perspective view showing a slot machine of an embodiment of the present invention.

FIG. **3** illustrates a button layout in a control panel of the slot machine shown in FIG. **2**.

FIG. **4** is an electrical block diagram of the slot machine shown in FIG. **2**.

FIG. **5** is a block diagram of an electric circuit in the reel assembly.

FIG. **6** is a functional block diagram showing the function of a game program executed by a main CPU **222** on the mother board **220**.

FIG. **7** illustrates an example of a symbol code table specifying symbols provided on the outer peripheral surfaces of the reels **52**A to **52**E.

FIG. **8** is a diagram showing the state where a trigger symbol is located in a predetermined position, and a diagram showing a trigger condition for transition to the chance mode.

FIG. **9** is a diagram showing pay lines of the slot machine according to the present embodiment.

FIG. **10** is a state transition diagram of the slot machine according to the present embodiment.

FIG. **11** is a diagram showing an example of a configuration of a symbol code determination table.

FIG. **12** is a diagram showing a field structure of the symbol code determination table in which a plurality of tables is integrated into a single table.

FIG. **13** is a diagram showing an example of symbol appearance probability tables.

FIG. **14** is a diagram showing an example of payout tables.

FIG. **15** is a flowchart showing a general process executed in the slot machine according to the present embodiment.

FIG. **16** is a flowchart showing the normal mode gaming process.

FIG. **17** is a flowchart showing the coin insertion/start check process shown in FIG. **16** in detail.

FIG. **18** is a flowchart showing the symbol determination process shown in FIG. **16** in detail.

FIG. **19** is a flowchart showing the symbol display control shown in FIG. **16** in detail.

FIG. **20** is a flowchart showing the payout process shown in FIG. **16** in detail.

FIG. **21** is a flowchart showing the chance mode gaming process.

FIG. **22** is a flowchart showing the chance mode gaming process.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

<<<Overview of Gaming Machine According to Embodiments>>>

FIG. **1** is a diagram showing an overview of a gaming machine according to an embodiment of the present invention.

A gaming machine according to an embodiment is the gaming machine capable of obtaining a game result based on a plurality of rearranged symbols, including:

a symbol display unit (such as a symbol display unit **40** described below, for example) for rearranging the plurality of symbols;

a memory (such as a ROM **224** and a RAM **226** described below, for example) having a first symbol determination table (such as a symbol determination table **340** described below, for example) for causing a first symbol (such as a "SAPPHIRE" symbol described below, for example) to appear on the symbol display unit in a normal game mode with a first probability, the normal game mode being to execute a normal mode game, and a second symbol determination table (such as symbol determination tables **341** to **343** described below, for example) for causing a second symbol (such as a "7" symbol described below, for example) to appear on the symbol display unit in a chance game mode with a second probability, the chance game mode being to execute a chance game; and

a controller (such as a CPU **222** described below, for example) for executing processes of:

(1-1) entering the mode into the chance game mode under the condition that a first symbol appears on a symbol display unit in the normal game mode (such as steps S**404** and S**408** in FIG. **15** described below, for example);

(1-2) terminating the chance mode under the condition that the number of games reaches a predetermined number in the chance game mode (such as step S**2217** in FIG. **22** described below, for example); and

(1-3) discontinuing the currently played chance game (termination of i-th session) and starting afresh the chance game from the first game (start of i+first session) under the condition that a second symbol appears on the symbol display unit upon the number of games being less than a predetermined number in the chance game mode (such as steps S**2219** and S**2221** in FIG. **22** described below, for example).

In the gaming machine according to the present embodiment, a game result can be obtained based on a plurality of symbols rearranged on the symbol display unit. The gaming machine according to the present embodiment is provided

with the symbol display unit, the memory, and the controller. The plurality of symbols is rearranged on the symbol display unit.

The memory has the first symbol determination table and the second symbol determination table. The first symbol determination table is the table for causing a first symbol to appear on the symbol display unit in a normal game mode with a first probability, the normal game mode being to execute a normal mode game. More specifically, when the symbols are rearranged on the symbol display unit using the first symbol determination table in the normal game mode, the first symbols appear on the symbol display unit with the first probability. The second symbol determination table is the table for causing a second symbol to appear on the symbol display unit in the chance game mode with a second probability, the chance game mode being to execute a chance mode game. More specifically, when the symbols are rearranged on the symbol display unit using the second symbol determination table in the normal game mode, the second symbols appear on the symbol display unit with the second probability.

The controller executes the processes (1-1) to (1-3).

The process (1-1) is the process for entering the mode to the chance game mode under the condition that the first symbol appears on a symbol display unit in the normal game mode. The process enables the mode to enter from the normal game mode into the chance game mode.

The process (1-2) is the process for terminating the chance game mode under the condition that the number of games reaches a predetermined number in the chance game mode. The process enables the mode to return from the chance game mode to the normal game mode.

The process (1-3) is the process for discontinuing the currently played chance game and starting afresh the chance game from the first game under the condition that a second symbol appears on the symbol display unit upon the number of games being less than a predetermined number in the chance game mode. The process enables the chance games to be played in a row. The chance games, however, is not simply added, but can be started from the first game so as to play the chance games in a row.

In this way, a chance game is started afresh from a first game, and thus simply adding more chance mode games is avoided. It is thus possible to provide the game that is prevented from progressing monotonously and provide a player with a feeling of tension. Furthermore, the number of chance games can be limited, and thus returning to a normal mode game can facilitate the consumption of more gaming media.

Furthermore, in the gaming machine according to the present embodiment, the second symbol determination table includes a plurality of determination tables having the second probabilities different from one another; and

the process (1-1) includes the process of:

(1-1-1) selecting a determination table from among the plurality of determination tables at random (such as the process at step **S2113** in FIG. **21** described below, for example).

In this way, it is possible to adjust the degree of achievement of chance games in a row.

Furthermore, in the gaming machine according to the present embodiment, the process (1-1) includes the process of:

(1-1-2) reporting information on a determination table selected at the process (1-1-1) (such as the process at step **S2115** in FIG. **21** described below, for example).

In this way, a player can recognize the degree of achievement of chance games in a row.

The gaming machine according to the present invention is capable of obtaining a game result based on a plurality of rearranged symbols, including:

a symbol display unit (such as a symbol display unit **40** described below, for example) for rearranging the plurality of symbols;

a memory (such as a ROM **224** and a RAM **226** described below, for example) having a first symbol determination table (a symbol determination table **340** described below, for example) for causing a first symbol (a "SAPPHIRE" symbol described below, for example) to appear on the symbol display unit in a normal game mode with a first probability, the normal game mode being to execute a normal mode game, and a plurality of second symbol determination tables (such as symbol determination tables **341** to **343** described below, for example) for causing a second symbol (a "7" symbol described below, for example) to appear on the symbol display unit in a chance mode with a second probability, the plurality of second symbol code determination tables having the second probabilities different from one another, and the chance game mode being to execute a chance game; and

a controller for executing processes of:

(1-1) entering the mode into the chance game mode under the condition that a first symbol appears on a symbol display unit in the normal game mode (such as steps **S404** and **S408** in FIG. **15** described below, for example);

(1-2) selecting a second determination table from among the plurality of second symbol code determination tables at random upon entering the mode into the chance game mode (such as step **S2113** in FIG. **21** described below, for example);

(1-3) reporting information on one of the second determination tables selected at the process (1-2) (such as step **S2115** in FIG. **21** described below, for example);

(1-4) initializing the number of games of the chance games upon entering the mode to the chance game mode (such as step **S2111** in FIG. **21** described below, for example);

(1-5) starting the chance game from the first game (such as step **S2213** in FIG. **22** described below, for example);

(1-6) counting the number of games of the executed chance games (such as step **S2125** in FIG. **21** described below, for example);

(1-7) terminating the chance game mode under the condition that the number of games reaches a predetermined number in the chance game mode (such as step **S2219** in FIG. **22** described below, for example);

(1-8) discontinuing the currently played chance game under the condition that a second symbol appears on the symbol display unit upon the number of games being less than a predetermined number in the chance game mode (termination of i-th session) (such as step **S2219** in FIG. **22** described below, for example);

(1-9) initializing the number of the games of the chance games after executing the process (1-8) (such as step **S2221** in FIG. **22** described below, for example); and

(1-10) returning the process to the process (1-4) after executing the process (1-9) (start of i+first session) (such as step **S2221** in FIG. **22** and step **S2127** in FIG. **21** described below, for example).

In this way, a chance game is started afresh from a first game, and thus simply adding more chance mode games is avoided. It is thus possible to provide the game that is prevented from progressing monotonously and provide a player with a feeling of tension. Furthermore, the number of chance games can be limited, and thus returning to a normal mode game can facilitate the consumption of more gaming media.

Embodiments will be described below with reference to the drawings.

<<<<First Embodiment of the Slot Machine>>>>

FIG. **2** is a perspective view showing a slot machine according to the present embodiment.

Gaming medium that can be used in a slot machine **10** includes a coin, a bill, or electrical information corresponding thereto. Also, credits stored in a barcoded ticket or an IC card can be used as the game medium in the slot machine **10**. The gaming media is not limited to those mentioned above, but the other types of media can be used as well.

The slot machine **10** shown in FIG. **2** is equipped with a cabinet **20**, a top box **30** installed on the cabinet **20**, and a main door **22** mounted in front of the cabinet **20**.

A symbol display unit **40** including a reel assembly **50** is provided at the main door **22**. In the present embodiment, the reel assembly **50** includes five reels **52**A to **52**E. Each of the reels **52**A to **52**E has a drum whose outer peripheral surface bears a plurality of types of symbols. The symbol display unit **40** includes a reel cover **54** which is attached in front of the reel assembly **50** and has a display window **56**. The reel cover **54** is provided on the outside so that a player can visually identify a part of the reels **52**A to **52**E. The reel cover **54** is provided on a display panel **58**. It is preferable to use a transparent liquid crystal panel as the reel cover **54**. The symbol display unit **40** includes a touch panel **59** for detecting touch input by a player.

In a state where the reels **52**A to **52**E are stopped, three symbols out of the symbols provided on each of the reels **52**A to **52**E are exposed through the window **56**. In this way, a symbol matrix with three rows and five columns are formed in the display window **56**. One or more lines are set in advance as pay lines for determining whether or not a winning has achieved. Each time a unit game is executed, the reels **52**A to **52**E provided with symbols spin in speed different from one another, and then stops to expose the symbols through the window **56**, thereby rearranging the symbols. The rearrangement of the symbols determines the result of the unit game. A benefit depending on the game result is awarded to the player. For example, when a winning combination by the rearranged symbols is achieved along one of the pay lines, a predetermined amount of payout is given to the player. Also, the rearrangement of the symbols determines a game mode of the subsequent unit game. The game modes are a normal mode and a chance mode, which will be described below in detail.

In addition, in the present embodiment, the unit game refers to the game that is executed in the period from the time when the start process of the credit for starting the game is executed to the time when the symbol columns stops so that the symbols are rearranged at the display window **56**, followed by the carrying out of the end process such as the payout corresponding to the result of the game. In addition, since the free game does not require a betting operation by the player, it is possible to set the time when the credit process is executed in the slot machine **10** as the start of the game. Furthermore, in the case of the game other than the free game, it is possible to set the time when the betting operation is done by the player as the start of the game. Moreover, the process corresponding to the result of the game determined depending on the rearranged symbols can be set as the end process. For example, it is possible to set the time, for example, when the payout process is executed corresponding to the winning as the end of the game.

A betting amount and a credit amount are displayed in predetermined areas on the display panel **58** of the reel cover **54**. The credit amount indicates the number of coins that are owned by the player and deposited inside the slot machine **10**. The payout amount indicates the number of coins to be given to the player when a winning combination is achieved.

The slot machine **10** employs the mechanical reels **52**A to **52**E in the present embodiment. In addition thereto, video reels or a combination of the mechanical reels and the video reels may be used.

An IC card reader **60** is provided below the symbol display unit **40**. The IC card reader **60** receives an IC card. The IC card stores predetermined data such as player identification information and game log data related with the games that the player has previously played. The IC card also can store data equivalent to coins, bills, or credits owned by the player. The IC card reader **60** reads and writes data from and to the inserted IC card. It is preferable that the IC card reader **60** is provided with a liquid crystal display unit for displaying the data read from the IC card.

A control panel **70** is provided in front of a lower end of the IC card reader **60**. The control panel **70** is provided with various buttons, a coin insertion unit **80**, and a bill insertion unit **81**. Specifically, as shown in FIG. **3**, a "RESERVE" button **71**, a "COLLECT" button **72**, and a "GAME RULES" button **73** are provided on an upper left area of the control panel **70**. A "1-BET" button **74**, a "2-BET" button **75**, a "3-BET" button **76**, a "5-BET" button **77**, and a "10-BET" button **78** are provided on a lower left area of the control panel **70**. Also, a "START" button **79** is provided on the lower center area of the control panel **70**. The coin insertion unit **80** is provided in the upper center area of the control panel **70**, and the bill insertion unit **82** is provided in the right area of the control panel **70**.

The "RESERVE" button **71** is used when the player temporarily leaves the seat or when the player wants to ask a staff of the game facility to exchange money, etc. Also, the "RESERVE" button **71** can be used to store credits remaining in an IC card inserted into the IC card reader **60**. The "COLLECT" button **72** is used to instruct the slot machine **10** to pay out credited coins to a coin tray **92**. The "GAME RULES" button **73** is used when the player is not acquainted with game rules or operation method. When the "GAME RULES" button **73** is pressed, various types of help information are displayed on a video display unit **110**.

The "BET" buttons **74** to **78** are used to set the betting amount. Each time the "1-BET" button **74** is pressed, one credit among the current credits owned by the player is bet for each of the active pay lines. When the "2-BET" button **75** is pressed, the game starts on condition that two credits are bet for each of the active pay lines. When the "3-BET" button **76** is pressed, the game starts on condition that three credits are bet for each of the active pay lines. When the "5-BET" button **77** is pressed, the game starts on condition that five credits are bet for each of the active pay lines. When the "10-BET" button **78** is pressed, the game starts on condition that ten credits are bet for each of the active pay line. The "START" button **79** is used to instruct the initiation of spinning the reels **52**A to **52**E under the betting condition that is set in advance.

When a coin is inserted into the coin insertion unit **80**, the inserted coins is guided into a hopper inside the cabinet **20**. When a bill is inserted into the bill insertion unit **82**, it is determined whether or not the inserted bill is legitimate, and then only a legitimate bill is received into the cabinet **20**.

On a lower front face of the main door **22** and below the control panel **30**, there are provided a lower glass part **90** and a coin tray **92**. The lower glass part **90** bears a character of the slot machine **10** or the like drawn thereon. Coins are paid out on the coin tray **92** from the cabinet **20**.

As shown in FIG. **2**, a video display unit **110** having a liquid crystal panel is provided at the front surface of the top box **30**. The video display unit **110** provides video effect for enhancing the amusingness of the game. Furthermore, the video

display unit **110** also displays information on the game rules and how to operate. A speaker **112** and a lamp **114** are provided on the side and top surfaces, respectively, of the top box **30**. The slot machine **10** provides sound effect or flashing light through the speaker **112** or the lamp **114**, which enhances the amusingness of the game.

A ticket printer **120**, a keypad **122**, and a data display device **124** are provided in the lower part of the video display unit **110**.

The ticket printer **120** prints, on a ticket, a bar code containing the credit data, date and time, and an ID number of the slot machine **10** to output the barcode ticket. The player can exchange the barcode ticket with bills or the like at a predetermined location in a gaming facility (e.g., from a cashier in a casino).

The keypad **122** has a plurality of keys. The operation of the plurality of keys by the player allows the various instructions pertinent to the issuance of the ticket. The data display device **124**, which has a fluorescent display tube, LEDs, or the like, displays data input by the player through the keypad **122**.

<<<Electrical Configuration of the Slot Machine>>>

FIG. **4** is an electric block diagram of the slot machine **10** shown in FIG. **2**. The slot machine **10** includes a game board **200**, a motherboard **220**, a door PCB **230**, and a main body PCB **240**.

A game board **200** includes a CPU **202**, a ROM **204** accessible from the CPU **202** through an internal bus, and a boot ROM **206** accessible from the CPU **202** by an internal bus. The game board **200** includes an IC socket **208** which can accommodate a memory card **210** and communicate therewith, and a card slot **212** provided corresponding to a Generic Array Logic (GAL) **214**.

The memory card **210** includes a non-volatile memory and stores a game program and a game system program.

The IC socket **208** is configured to be removably attached by the memory card **210**. The IC socket **208** is connected to a motherboard **220** by an IDE bus. The game executed in the slot machine **10** can be changed by replacing the memory card **210** with another one. The game executed in the slot machine **10** also can be changed by withdrawing the memory card **210** from the IC socket **208**, writing another program into the memory card **210**, and then inserting the memory card **210** into the card slot **208** again.

The GAL **214**, which is a type of a Programmable Logic Device (PLD) having a fixed OR array structure, has a plurality of input ports and output ports. Upon receiving a predetermined data through the input ports, the GAL **214** outputs data corresponding to the input data through the output ports.

The card slot **212** is configured in such a manner that the GAL **214** can be inserted into the card slot **212** or detached from the IC socket **212**, and is connected to the motherboard **220** by a PCI bus.

The CPU **202**, the ROM **204**, and the boot ROM **206** interconnected by the internal bus are connected to the motherboard **220** by the PCI bus. The PCI bus enables signal transmission between the motherboard **220** and the game board **200**, and supply of power from the motherboard **220** to the game board **200**.

The ROM **204** stores a program. The boot ROM **206** stores a preliminary authentication program, a boot code to be used by the CPU **202** for activating the preliminary authentication program, and the like. The authentication program is a falsification check program for authenticating that the game program and the game system program are legitimate. The preliminary authentication program is a program for authenticating that the authentication program is legitimate. The authentication program and the preliminary authentication program are written in a process of verifying that the program of interest is not falsified.

A commonly available main board is used as the motherboard **220**, and thus the motherboard **220** executes the game program and the game system program. The motherboard **220** includes a main CPU **222**, a ROM **224**, a RAM **226**, and a communication interface **228**.

The ROM **224** is a memory device for storing a program to be executed by the main CPU **222**, and is maintained permanently along with the other data, like BIOS. The ROM **224** may be a flash memory. The BIOS program initializes peripheral devices when executed by the main CPU **222**. Also, the BIOS program loads the game program and the game system program stored in the memory card **210** through the game board **200**. The ROM **224** may be rewritable. However, write-protected one might be used as the ROM **224** as well.

The RAM **226** stores data and programs which are used while the main CPU **222** is in operation. For example, when the game program, the game system program, or the authentication program is to be loaded, the RAM **224** can store such programs. Also, the RAM **226** is provided with working space for the execution of the programs. For example, the space stores the number of bets, the payout amount, the credit amount, etc., which are maintained during the execution of the game. Also, a plurality of tables for defining symbols, symbol codes, winning combinations, and their probabilities is maintained during the execution of the game. Further, the RAM **226** stores a symbol code determination table. The symbol code determination table stores mapping information between symbol codes and random number which are used for determining symbols based on random numbers. In particular, the RAM **226** maintains a mode flag along with a game counter. The mode flag is the flag indicating the game mode. The game counter is the count value indicating the number of unit games which has already been executed in the chance mode or the number of remaining unit games in the chance mode.

Also, the RAM **226** stores count values of a plurality of counters. The plurality of counters include a bet counter, a payout amount counter, a credit amount counter, and a chance mode game counter which counts the number of unit games in the chance mode. In addition, some of the count values may be maintained in an internal register of the main CPU **222**.

The main CPU **222** communicates with an external controller through a communication interface **228**. The external controller includes, for example, a server connected through a communication channel (not shown).

The motherboard **220** is connected to the door PCB **230** and the main body PCB **240**. The motherboard **220** can communicate by means of USB with the door PCB **230** and the main body PCB **240**. The motherboard **220** is connected to a power supply **252**. The main CPU **222** of the motherboard **220** boots up and operates using the power supplied from the power supply **252**. The motherboard **220** passes a part of power to the game board **200** through the PCI bus so as to boot up the CPU **202**. The door PCB **230** and the main body PCB **240** are connected to an input device. The input device includes a switch, a sensor, and peripheral devices of which operation are controlled by the main CPU **222**. The door PCB **230** is connected with a control panel **70**, a coin counter **232**, a reverter **234**, and a cold cathode tube **236**.

The control panel **70** has a reserve switch **71**S, a collect switch **72**S, a game rule switch **73**S, a 1-BET switch **74**S, a 2-BET switch **75**S, a 3-BET switch **76**S, a 5-BET switch **77**S, a 10-BET switch **78**S, and a start switch **79**S, each of which is provided corresponding to various buttons **71**-**79**. Upon

detecting the fact that the various buttons **71** to **79** are pressed, each of the switches **71**S to **79**S outputs a signal to the main CPU **222**.

The coin counter **232** and the reverter **234** are provided in the coin insertion unit **80**. The coin counter **232** determines whether or not the coins inserted into coin insertion unit **80** is legitimate in terms of material, shape, or the like. The coin counter **232** outputs a signal to the main CPU **222** if detecting a legitimate coin. The coins which are determined as being illegitimate are discharged to the coin tray **92**. The reverter **234** operates based upon a control signal from the main CPU **222**. The reverter **234** distributes the coins that are determined by the coin counter **232** as being legitimate into either a hopper **242** or a cash box (not shown). The coins are guided into the hopper **242** when the hopper **242** is not filled with coins. Contrarily, the coins are guided into the cash box when the hopper **242** is filled with coins.

The cold cathode tube **236** is provided on the rear surface of the video display unit **110**. The cold cathode tube **236** functions as a backlight as well as lights based on a control signal from the main CPU **222**.

The main body PCB **240** is connected to the speaker **112**, the lamp **114**, the hopper **242**, a coin detector **244**, the touch panel **59**, a bill validator **246**, the reel assembly **50**, the IC card reader **60**, a graphic board **250**, the ticket printer **120**, a key switch **122**S, and the data display **124**.

The lamp **114** is turned on/off based upon a control signal from the main CPU **222**. The speaker **112** outputs a sound such as BGM based upon the control signal from the main CPU **222**.

The hopper **242**, which operates based upon a control signal from the main CPU **222**, pays out the designated payout amount of coins to the coin tray **92** through a coin payout outlet (not shown) formed between the lower glass part **90** and the coin tray **92**. The coin detector **244** detects coins paid out from the hopper **242** to output a detection signal to the main CPU **222**.

The touch panel **59** detects a position touched by the player, and then provides the main CPU **222** with a position detection signal corresponding to the detected position. Upon detection of a legitimate bill, the bill validator **246** provided in the bill insertion unit **82** provides the main CPU **222** with a bill detection signal corresponding to the bill amount.

The graphic board **250** controls both the video display unit **110** and the display panel **58** of the symbol display unit **40** corresponding to a control signal from the main CPU **222**. The graphic board **250** includes a Video Display Processor (VDP) for generating video data, and a video RAM for temporarily storing the video data. The video data may be generated from the game program stored in the RAM **224**.

The IC card reader **60** reads out data stored in the IC card inserted into the IC card socket **208** to provide the read-out data to the main CPU **222**. The IC card reader **60** writes the data supplied to the main CPU **222** into the ID card.

The ticket printer **120** prints on a ticket the barcode containing information of the credit amount stored in the RAM **226**, date and time, the identification number of the slot machine **10**, and the like, corresponding to the control signal from the main CPU **222** in order to output the barcoded ticket.

The key switch **122**S, which is provided behind the keypad **122**, outputs a key detection signal to the main CPU **222** when the keypad **122** is pressed by the player.

The data display device **124** displays information on the information that is input through the keypad **122** corresponding to a control signal from the main CPU **222**.

The main body PCB **240** is electrically connected to the reel assembly **50**. The reel assembly **50** includes the first to fifth reels **52**A to **52**E as mentioned above. FIG. **5** is a block diagram of an electric circuit in the reel assembly **50**. Each of the reels **52**A to **52**E is provided on a reel circuit board **260**. The reel circuit board **260** includes an 20 input/output (I/O) unit **262** capable of communicating with the main body PCB **240**, a reel driver **264** connected to the I/O unit **262**, a backlight driver **266**, and an effect illumination driver **268**.

The I/O unit **262** is connected to a magnetic field detector **270**. The magnetic field detector **270** includes a magnetic sensor for sensing magnetic field intensity to output a magnetic detection signal proportional to the magnetic field intensity, and a sensor fixation part for fixing the magnetic sensor to a predetermined position. The magnetic sensor detects the intensity of the magnetic field generated by a magnet. The magnet is provided at a rotating axis of a reel motor **272** to rotate with the reel **52**A.

The reel driver **264** supplies electric power to the reel motor **272**. The backlight driver **266** supplies electric power individually to each light source **282** in a backlight device **280**. The effect light illumination driver **268** supplies electric power individually to each light source **292** of an effect light illumination device **290**.

Since the second to fifth reels **52**B to **52**E have the same configuration as the first reel **52**A, detailed description thereof will be omitted.

<<<Function of the Game Program>>>

FIG. **6** is a functional block diagram of the game program executed in the main CPU **222** of the motherboard **220**. When the power is supplied to the slot machine **10**, the main CPU **222** reads the authenticated game program and game system program from the memory card **210** through the game board **200**, and writes the programs into the RAM **226**. The game program is executed in a state being loaded into the RAM **226** in such a manner.

According to the preferred embodiment, the game program includes a input/credit check process part **300**, a random number generating process part **302**, a symbol determination process part **304**, a game counter process part **306**, a reel control process part **308**, a winning determination process part **310**, an effect control process part **312**, a payout process part **314**, and a game mode determination process part **316**.

<Input/Credit Check Process Part **300**>

The input/credit check process part **300**, in an idle state where the reels **52**A to **52**E are stopped, continuously checks whether or not any of the "BET" buttons **74** to **78** or the "START" button **20 79** is pressed. If the "BET" buttons **74** to **78** or the "START" button **79** is pressed, the input/credit check process part **300** checks whether or not there remains any credit for the player on the basis of the credit data **320** stored in the RAM **226**. If at least one credit for the player remains, the input/credit check process part **300** call the random number generating process part **302**.

Subsequently, the random number generating process part **302** generates random numbers which are used in the symbol determination process part **304**. In the present embodiment, the random number generating process part **302** generates five random numbers. Each of the five random numbers is used in the first to fifth reels **52**A to **52**E, respectively.

After five random numbers are completely extracted, the symbol determination process part **304** determines a to-be-stopped symbol for each of the reels **52**A to **52**E with reference to the symbol code determination table stored in the RAM **226**. The symbol determination process part **304** uses five random numbers to determine five to-be-stopped symbols for the reels **52**A to **52**E to be appeared in the display window **56** of the symbol display unit **40** for each of the reels **52**A to **52**E.

In particular, the symbol determination process part **304** checks the current gaming mode with reference to the mode flag **322** stored in the RAM **226**. The process of determining symbols in the normal mode is different from the process of determining symbols in the chance mode. In the normal mode, the symbol determination process part **304** uses a predetermined symbol code determination table to determine the symbol using the random number in accordance with a predetermined process. Contrarily, in the chance mode, the symbol determination process part **304** continuously changes the symbol code determination table for each unit game to vary the symbol determination process. The continuous varying of the symbol code determination table can increase winning combinations including at least one specific symbol as the chance mode game continues. The number of chance mode games executable within a single session is limited to a predetermined number of times, e.g., seven times. In order to limit the number of times of chance mode games, the game counter process part **306** counts the number of times of chance mode games which have already been executed and the number of times of chance mode games which remain in that session. The value of the game count **324** is stored in the RAM **226**. The game counter process part **306** may reside in the symbol determination process part **304**.

The reel control process part **308** controls the reel assembly **50** by providing stop position information corresponding to the determined symbols. In this way, the reels **52**A to **52**E spins, followed by stopping at the position designated by the stop position information. More specifically, the symbols scroll along with the spinning of the reels **52**A to **52**E. Then, the reels **52**A to **52**E are stopped in such a manner that the determined symbols are rearranged in the central position vertically in the window **56** of the symbol display unit **40**.

The winning determination process part **310** determines whether or not a predetermined winning combination is achieved by the rearranged symbols. In case that a winning combination is achieved by the rearranged symbols, the effect control process part **312** controls the symbol display unit **40** and the other devices. The other devices include the speaker **112**, the lamp **114**, the video display unit **110**, etc. The effect includes video and audio effect, backlight change, and lighting effect. Also, the payout process part **314** determines payout amount corresponding to the achieved winning combination to give the player that payout amount.

Furthermore, each time the unit game is completed, the game mode determination process part **316** determines the game mode of the next unit game. The game mode determination process part **316** changes the mode from the normal mode into the chance mode when a trigger event occurs in the rearranged symbols. On the other hands, the game mode determination process part **316** changes the mode from the chance mode into the normal mode when an end condition is satisfied. In the other cases, the game mode determination process part **316** maintains the previous game mode. The game mode determination process part **316** may be run in the winning determination process part **310**.

<<Symbols, Winning Combinations, and Pay Lines>>

FIG. **7** shows an example of a symbol code table specifying symbols provided on the outer peripheral surfaces of the reels **52**A to **52**E.

The symbols provided on each of the reels **52**A to **52**E form a symbol column composed of eleven symbols. As described hereinbelow, the alignment of symbols provided on each of the reels **52**A to **52**E are referred to as first to fifth symbol columns, respectively. In the present embodiment, the symbol columns include six types of symbols. The six types of symbols are "7", "BAR", "DOUBLE BAR", "TRIPLE BAR", "CHERRY", and "SAPPHIRE". In each of the symbol columns, each of the symbols has an assigned code ranging from "00" to "10." For example, the first symbol, "BAR", in the first symbol column is assigned a code "01." The second symbol, "7", in the first symbol column is assigned a code "00." The eighth symbol, "7", in the first symbol column is assigned a code "07."

Three consecutive symbols in each symbol column can be appeared in the display window **56** of the symbol display unit **40** to form a symbol matrix having three rows and five columns. Each time the "BET" buttons **74** to **78** or the "START" button **79** are pressed, the reels **52**A to **52**E on which the symbols are provided starts spinning, and thus the symbols appear in the display window **56** in the manner in which the symbols are scrolled vertically. After a predetermined time period elapses, the scroll of the symbols stops to rearrange the symbol, and then the symbol matrix is formed in the display window **56**.

<"SAPPHIRE" Symbol>

The "SAPPHIRE" symbol appearing only in the third symbol column serves as a trigger symbol which shifts the game mode into the chance mode. In the present embodiment, the "SAPPHIRE" symbol is configured by the image which resembles sapphire, a gem. The chance mode is initiated after the "SAPPHIRE" symbol appears at the position of the second row and third column in the display window **56**, as shown in FIG. **8**. In addition, the condition for returning of the game mode from the chance mode into the normal mode will be described below.

A plurality of kinds of winning combinations of symbols (referred to as "winning combinations" hereinbelow) for giving benefit to the player is preset. The benefits given to the player include a predetermined amount of payout by increasing of credits or discharging of coins.

FIG. **9** shows pay lines set in a preferred embodiment of the present invention. In the present embodiment, five pay lines are set for the symbol matrix. First to third pay lines extend horizontally across the symbol stop positions in the first to third rows, respectively, in the symbol matrix. A fourth pay line extends in a "V"-shaped line joining the symbol stop position in the first row and the first column, the symbol stop position in the second row and the second column, the symbol stop position in the third row and the third column, the symbol stop position in the second row and the fourth column, and the symbol stop position in the first row and the fifth column. A fifth pay line extends in a "reversed V"-shaped path joining the symbol stop position in the third row and the first column, the symbol stop position in the second row and the second column, the symbol stop position in the first row and the third column, the symbol stop position in the second row and the fourth column, and the symbol stop position in the third row and the fifth column.

Each of the pay lines can be activated depending on the player's choice. However, all the five pay lines can be activated irrespective of the betting amount or the player's choice. The total number of pay lines can vary depending on the size of the symbol matrix, and the other pay lines can be set appropriately.

<<Gaming Modes: Normal Mode and Chance Mode>>

The slot machine **10** selectively executes two modes: normal mode and chance mode. The processing of the game in the chance mode is similar to that in the normal mode in most cases. However, the payouts for at least some of the winning combinations in the chance mode are different from those in the normal mode. Also, producing effects such as video effect and sound effect can differ between the two game modes. In addition, the unit game executed in the normal mode may be

herein referred to simply as a normal mode game. Likewise, the unit game executed in the chance mode may be referred to simply as a chance mode game.

<<State Transition of Game>>

FIG. **10** is a state transition diagram of the slot machine **10**.

Usually, the slot machine **10** is in a state of the normal mode, and maintains the normal mode state unless a trigger event occurs. When the trigger event occurs during the normal mode, a state transition occurs to shift the game mode to the chance mode. In a preferred embodiment, the trigger event is the appearance of the "SAPPHIRE" symbol at the position in the second row and third column of the symbol matrix.

When the game mode proceeds to the chance mode, the slot machine **10** maintains this state unless an end condition is satisfied. In the present embodiment, the end condition of the free game is that the free games which are the games in the chance mode have been executed up to the predetermined number of times, such as seven. More specifically, the unit games constituting the free game in the chance mode have been executed up to seven times which is the maximum number of times of the unit games.

After the game mode proceeds to the chance mode, the slot machine **10** sets a game counter which counts up or down each time the unit game in the chance mode is executed. The maximum number of unit games in the chance mode is seven in a single chance mode session. The term "chance mode session" herein denotes the period from the time when the game mode proceeds to the chance mode (when the chance mode starts) to the time when the game mode returns to the normal mode (when the chance mode ends) and the state therein. Thus, if the value of the game counter reaches seven upon counting up or the value of the game counter reaches zero upon counting down, the game mode returns to the normal mode and the unit game restarts in the normal mode.

<<Symbol Code Determination Tables and Payout Tables>>

Regardless of the game modes, the symbol combination is determined based on a plurality of tables stored in the RAM **224** of the motherboard **220**. As mentioned above, the RAM **226** stores at least one of the symbol code determination table and/or the symbol code determination table.

FIG. **11** shows an example of configuration of the symbol code determination table.

The symbol code determination tables **340** to **343** stores a mapping relationship between the random numbers generated by the random number generation process part **302** and the symbol codes indicating each of the symbols as shown in FIG. **6**. Thus, each time a random number is generated by the random number generation process part **302**, the symbol determination process part **304** determines a symbol code associated with a symbol with reference to the symbol code determination tables **340** to **343**. The wider a random number range is, the higher the probability that the symbol associated with the widened range is determined becomes. Also, as the total range of the random numbers is widened, the probability of determining the symbol code can be controlled more precisely.

The symbol code determination table **340** is used for determining symbols in the normal mode. The symbol code determination tables **341** to **343** are used for determining symbols in the chance mode games. More specifically, the symbol code determination table **341** is the table in which the number of times of the free games in the chance mode executed in a row is determined to be about 4.5 times (the probability of executing the games in a row is 82%). The symbol code determination table **342** is the table in which the number of times of the free games in the chance mode executed in a row is determined to be about 3.0 times (the probability of executing the games in a row is 75%). The symbol code determination table **343** is the table in which the number of times of the free games in the chance mode executed in a row is determined to be about 2.0 times (the probability of executing the games in a row is 67%). When the mode enters from the normal mode into the chance mode, one of the tables is selected at random from among three symbol code determination tables **314** to **343**.

In the case that the first to fifth symbol columns are different from one another, each of the symbol code determination tables **340** to **343** may be further configured by dividing them into five tables each of which correspond to its own symbol column. For example, all the tables can be integrated into a single table having 20 data fields, as shown in FIG. **12**. More specifically, the symbol code determination table **340** is configured by dividing it into first to fifth symbol columns. Each of the symbol code determination tables **341** to **343** is configured by dividing each of them into first to fifth symbol columns, respectively. Each of the tables can be composed of 20 data fields in total by the configuration in such a manner. Each of 20 data fields stores the mapping relationship between a random number generated by the random number generating process part **302** and a symbol code indicating each of symbols shown in FIG. **7**.

Depending on the game modes and symbol columns, the symbol determination process part **304** can select one data field from among the 20 data fields to determine the symbol code. In the present embodiment, each of 20 data fields can be regarded as a separate table.

In the case that two or more symbol columns are the same as each other, the symbols can be determined in those columns using a symbol code determination table in common with each other. For example, in the example of FIG. **7**, the second symbol column has the same symbol sequence as that in the fourth symbol column. Thus, the symbol code determination table for the second column can be used for the symbol determination in the fourth column. Similarly, since the first symbol column has the same symbol sequence as that in the fifth symbol column. Thus, the symbol code determination table for the first column can be used for the symbol determination in the fifth column.

Once the symbol determination process part **304** determines five symbols in a predetermined row (e.g., the second row) in the symbol matrix to determine all the symbols constituting the symbol matrix, the winning determination process part **310** determines whether or not any of the winning combinations is achieved, and the game mode determination process part **316** determines the game mode of a subsequent unit game.

FIG. **13** shows an example of a symbol appearance probability table. The symbol appearance probability table is the table that determines the probability of appearance of the symbols. The symbol appearance probability tables **360** to **363** specify the probabilities that each symbol appears in the pay lines. The symbol determination tables **340** to **343** shown in FIG. **11** can be prepared based on the symbol appearance probability tables **360** to **363**. The symbol appearance probability table **360** is used for the normal mode, and the symbol appearance probability tables **361** to **363** are used in the chance mode games. More specifically, the symbol appearance probability table **361** corresponds to the symbol code determination table **341**. The symbol appearance probability table **362** corresponds to the symbol code determination table **342**. The symbol appearance probability table **363** corresponds to the symbol code determination table **343**.

Similarly to the symbol code determination tables **340** to **343**, each of the symbol appearance probability tables **360** to

363 may be divided into five tables each of which corresponds to its own symbol column. Furthermore, all the tables can be integrated into a single table having 20 data fields as well.

The probability that each symbol appears in pay lines influences on the probabilities that the winning combinations are achieved. Conversely, the symbol appearance probability tables **360** to **363** can be generated based on the probabilities of the winning combinations. The relationships between the winning combinations and respective probabilities can be summarized as payout tables **380** to **383** shown in FIG. **14**. The payout tables **380** to **383** define the winning combinations along with their respective payouts. The payout tables **380** to **383** are prescribed separately for the normal mode games and the chance mode games. In particular, it is preferable to separately prescribe the payout tables for use in the unit games in the chance mode. Among the payout tables **380** to **389**, the payout table **380** is used for the normal mode games, and the payout tables **381** to **383** are applicable for the chance mode games. All the payout tables **380** to **383** can be integrated into a single table as well. More specifically, the payout table **381** corresponds to the symbol code determination table **341**. The payout table **382** corresponds to the symbol code determination table **342**. The payout table **383** corresponds to the symbol code determination table **343**.

Each time the unit game is executed, the winning determination process part **310**, which is contained in the game program and executed by the main CPU **222**, determines whether or not any winning combination is achieved in the pay lines. If the winning combination defined in the payout tables **380** to **383** is included in one of the pay lines, the winning determination process part **310** detects the winning combination and checks the payout amount with reference to the payout tables **380** to **383**. The payout process part **314** pays out the determined amount. If, however, no winning combination is achieved by the symbols appeared on the pay line, it is determined to be so-called losing.

For example, in case where three "7" symbols appear in one of the pay lines LINE1 to LINE5 across the symbol columns, it is regarded as a winning combination of three "7" being achieved, and thus two hundred times the betting amount is paid out as the payout amount. The benefit of payout can be provided for the player by actually discharging coins to the coin tray **92**, or adding the credits by the amount equivalent to the coin.

<<Probabilities of Winning in Chance Mode>>

As mentioned above, when the "SAPPHIRE" symbol appears at the position in the second row and third column in the symbol matrix, the game mode proceeds from the normal mode to the chance mode, and the chance mode is maintained until the end condition is satisfied. The end condition of the chance mode is that the unit games constituting the free game in the chance mode have been executed up to seven times which is the maximum number of times of the unit games.

When the game mode proceeds to the chance mode, the game counter process part **306** shown in FIG. **6** first selects a symbol code determination table from among the three symbol code determination tables **341** to **343** at random. The game counter process part **306** also sets a counter for counting the number of unit games that has been already executed in the chance mode, or the number of unit games that is to be executed in the chance mode. Then, the random number generation process part **304** generates the random numbers, and the symbol determination process part **304** determines to-be-stopped symbols using the generated random numbers with reference to the symbol code determination tables **341** to **343**.

The symbol determination process part **341** is the table in which the number of times of the free games in the chance mode executed in a row is determined to be about 4.5 times (the probability of executing the games in a row is 82%). The symbol code determination table **342** is the table in which the number of times of the free games in the chance mode executed in a row is determined to be about 3.0 times (the probability of executing the games in a row is 75%). The symbol code determination table **343** is the table in which the number of times of the free games in the chance mode executed in a row is determined to be about 2.0 times (the probability of executing the games in a row is 67%). Each of the symbol code determination tables **341** to **343** has a mapping data between the random number and the symbol code.

In the present embodiment, a specific symbol is a "7" symbol. More specifically, when more than three "7" symbols appear in one of the pay lines in the chance mode, the chance game in the current session is terminated and then the chance game in the next session is started afresh from the first game.

<<Operation of Slot Machine>>

The operation of the slot machine **10** will be described with reference to FIGS. **15** to **20**.

FIG. **15** shows the process executed in the slot machine **10**.

When the power is supplied to the slot machine **10**, the main CPU **222** loads the authenticated game program and game system program by reading the programs from the memory card **210** through the game board **200** and writing them into the RAM **226** (step S**400**). Subsequently, the main CPU **222** executes the game program and the game system program.

When the unit game is started by inserting the IC card into the IC card reader **60** or inserting coins into the coin insertion unit **80**, the player can execute a new game based on the inserted coins or the stored bets. When the unit game is initially played after starting up the slot machine **10**, the game mode goes into the normal mode. Thus, the main CPU **222** executes the normal mode game process for the initial unit game (step S**402**).

Whenever the normal mode game is completed, the game mode determination process part **316** executed by the main CPU **222** determines whether or not the trigger event occurs (step S**404**). Unless the trigger event occurs, the game mode of the subsequent game remains in the normal mode. Thus, the main CPU **222** returns the process to step S**402** to execute the normal mode game process for the subsequent unit game.

If, however, determining in the determination process at step S**404** that trigger event has occurred, the main CPU **20** changes the game mode of the subsequent game to the chance mode.

As mentioned above, in a preferred embodiment, the number of unit games that can be executed in a single session in the chance mode is limited to seven. The symbol code determination tables **341** to **343** are different from one another, and thus can be used for each of the unit games in the chance mode. Whenever each of the unit games in the chance mode is executed, the game counter increases the number of the unit games that has been already executed in the session, or decreases the number of the unit games that remains in the session. In the description below, it is assumed that the game counter increases the number of the unit games that has been already executed from zero. Thus, in the process at step S**406**, the main CPU **222** sets a game counter to be zero. Afterwards, the main CPU **222** executes the chance mode game process for the subsequent game (step S**408**).

Each time the unit game in the chance mode is completed, the game mode determination process part **316** determines whether or not the end condition is satisfied (step S**409**). Unless the end condition is satisfied, the game mode of the subsequent unit game remains in the chance mode. Thus, the

main CPU **222** returns the process to step S**408** to execute the chance mode game process for the subsequent unit game.

If, however, determining in the determination process at step S**409** that the end condition is satisfied, the main CPU **222** returns the game mode of the subsequent unit game to the normal mode. Thus, the main CPU **222** returns the process to step S**402** to execute the normal mode game process for the subsequent unit game.

FIG. **16** shows the normal mode execution process, which shows step S**402** shown in FIG. **15** in detail.

Each time a unit game is completed, the main CPU **222** executes memory initialization process (step S**410**). In this initialization process, the main CPU **222** clears unnecessary data and information from the temporary working area in the RAM **226**. The unnecessary data and information includes the payout data, awarding or failure information, and the to-be-stopped symbol information determined in the previous unit game.

Subsequently, the main CPU **222** executes coin-insertion/start-check process (step S**412**). In this process, the main CPU **222** checks the entry of coins or bills, and scans inputs from the BET buttons **74** to **78** and the START button **79**.

After the START button **79** is pressed by the player, the main CPU **222** executes symbol determination process (step S**414**). In this process, the main CPU **222** generates five random numbers and determines five symbol codes of five to-be-stopped symbols corresponding to the random numbers with reference to the symbol code determination table **340**. The main CPU **222** determines whether or not any winning combination is achieved by the rearranged symbol matrix that is formed of the rearranged symbols.

At step S**416**, the main CPU **222** executes symbol display control process. In this process, the main CPU **222** controls the reel assembly **50** to rotate the reels **52**A to **52**E, and then to stop rotating the reels **52**A to **52**E in order to rearrange the symbols in accordance with the symbol determination result to form the symbol matrix in the display window **56**.

Then, at step S**418**, the main CPU **222** determines the payout amount, and executes the payout process to provide the player with the determined payout amount.

FIG. **17** shows the coin-insertion/start-check process, which shows the process at step S**412** shown in FIG. **16** in detail.

First, the main CPU **222** determines, by means of the input/credit checking process part **300** executed in the main CPU **222**, whether or not the coin counter **232** detects insertion of a coin (step S**430**). When determining at step S**430** that a coin has been inserted, the main CPU **222** adds the value of the inserted coin to the credits stored in the RAM **226** (step S**432**). At this stage, the main CPU **222** may further determine whether or not the bill validator **246** detects insertion of a bill. When determining that a bill has been inserted, the main CPU **222** adds the value of the inserted bill to the credits.

When the process at step S**432** has been completed or when it is determined at step S**430** that no coin has been inserted, the main CPU **222** determines whether or not the credit amount is zero (step S**434**). If determining in the determination process at step S**434** that there remains some credits, the main CPU **222** allows the bet setting inputs through the BET buttons **34** to **38** up to the remaining credits (step S**436**). If determining in the determination process at step S**434** that there remains no credit, the main CPU **222** returns the process to step S**430**.

Afterwards, main CPU **222** monitors the bet setting input through the BET buttons **74** to **78** based on bet setting input signals output from the bet switches **74**S to **78**S (step S**438**). If the main CPU **222** determines that any of the BET buttons **74** to **78** has been pressed by the user, the main CPU **222** adjusts the betting amount value stored in the RAM **226** according to the pressed BET button, and subtracts the betting amount from the credit value stored in the RAM **226** (step S**440**). If determining in the determination process at step S**434** that there is no BET button input for a predetermined time, the main CPU **222** proceeds the process to step S**448**.

During the increase of the betting amount, the main CPU **222** determines whether or not the betting amount reaches a predetermined maximum value (step S**442**). When the betting amount has reached the predetermined maximum value, the main CPU **222** prohibits any further increase of the betting amount (step S**444**).

Upon completing the process at step S**444** or determining that betting amount has not reached the maximum value in the process at step S**442** and the betting amount is adjusted, the main CPU **222** allows the operation input through the START button **79** (step S**446**). At this stage, the main CPU **222** can display the set pay lines the symbol display unit.

In the process at step S**448**, the main CPU **222** determines whether or not the input through the START button **79** is detected (step S**448**). When the input from the START button **79** has not been detected for a predetermined standby time, the main CPU **222** returns the process to step S**430**. If determining in the process at step S**448** that the input from the START button **79** has been detected, the main CPU **222** terminates the coin-insertion/start-check process.

<<Symbol Determination Process>>

FIG. **18** shows the symbol determination process, which shows step S**414** shown in FIG. **16** in detail.

First, the random number generation process part **302** executed by the main CPU **222** extracts five random numbers (step S**450**).

Subsequently, the symbol determination process part **304** executed by the main CPU **222** determines first to fifth symbol codes using the first to fifth random numbers, respectively, with reference to the symbol code determination table **340** (step S**452**). Then, the main CPU **222** determines first to fifth to-be-stopped symbols corresponding to the first to the fifth symbol codes, respectively, with reference to the symbol code table, as shown in FIG. **7** (step S**454**). As a result, the five to-be-stopped symbols are determined by use of the five random numbers. Upon determination of the first to fifth to-be-stopped symbols, the main CPU **222** stores the symbols or symbol codes in the RAM **226**.

The five to-be-stopped symbols are symbols to be stopped at the second row of each column of the symbol matrix shown in FIG. **9**. Since the symbol alignments constituting the first to fifth symbol columns are fixed corresponding to each of the reels **52**A to **52**E, determining the to-be-stopped symbols determines all the symbols constituting the symbol matrix. The main CPU **222** determines all the symbols constituting the symbol matrix based on the to-be-stopped symbols with reference to the symbol code table of FIG. **7**.

Afterwards, the winning determination process part **310** executed by the main CPU **222** determines whether or not any winning combination is achieved by the symbols constituting the symbol matrix determined in the process at step S**456** (step S**456**). In case that a winning combination is achieved by the symbols constituting the symbol matrix, the winning determination process part **310** stores the winning combination in the RAM **226** (step S**456**). In addition, the main CPU **222** may determine whether or not the winning combination is achieved from the symbol codes of to-be-stopped symbols without determining whether or not the winning combination is achieved using the symbol matrix.

Finally, the symbol determination process terminates and the execution flow returns to the main process (not shown).

<<Symbol Display Control Process>>

FIG. **19** shows the symbol display control process, which shows step S**416** shown in FIG. **16** in detail.

First, the reel control process part **308** executed by the main CPU **222** transmits a spin control signal to the reel assembly **50** so that the reel driver **264** of the first to fifth reels **52**A to **52**E supplies power to the reel motor **272** to spin the reels. Each of the first to fifth reels **52**A to **52**E rotates at the speed different from one another, and the symbol alignment provided on the reels **52**A to **52**E scrolls in the display window **56** of the symbol display unit **40** (step S**460**).

While the first to fifth reels **52**A to **52**E rotates, the backlight driver **266** supplies power to the light sources **282** of the backlight device **280** and the effect illumination driver **268** supplies power to the light source **292** of the effect light illumination device **290** to execute the effect from behind the reel surfaces.

The spin control signal contains information of stop positions of the reels **52**A to **52**E. The reel driver **264** of the reels **52**A to **52**E controls the reel motors **272** to stop the reels **52**A to **52**E at the position indicated by the spin control signal. Thus, the reel motors **272** composed of stepping motors is stopped at desired positions, and the scroll of the symbol columns is stopped so that the to-be-stopped symbols are arranged in the second row of the symbol matrix formed in the display window **56** (step S**464**).

Finally, the symbol display control process terminates and the execution flow returns to the main function.

<<Payout Process>>

FIG. **20** illustrates the payout process, which shows step S**418** shown in FIG. **16** in detail.

When a winning combination is achieved, the winning determination process part **310** or the payout process part **314** executed by the main CPU **222** determines the payout amount corresponding to the winning combination and stores the amount in the RAM **226** (step S**470**).

As soon as the reels **52**A to **52**E stop, the effect control process part **312** executed by the main CPU **222** controls the symbol display unit **40** and the other devices, such as the speaker **112**, the lamp **114** and the video display unit **110**, to execute the effects (step S**472**). The production effect includes video, audio effect, backlight change, and illumination effect.

Afterwards, the payout process part **314** pays out the determined amount by increasing the credits or discharging coins to the coin tray **92** (step S**474**).

<<Chance Mode Execution Process>>

In the present embodiment, a free game is executed as the game in the chance mode. Accordingly, in the game in the normal mode, the unit game is started based on the fact that the BET operation is carried out by a player. In contrast, in the game in the chance mode, the unit game can be started without carrying out the BET operation by a player.

The term "free game" refers to the game in which a player can have a chance to acquire the game value without paying or consuming the game value. For example, that is the game in which the unit game can be executed without inserting a coin or a credit into the slot machine **10**, so that the coin and the credit cannot be consumed even if the game resultingly ends in failure. In this manner, the game in the chance mode being as the free game enables the player to get a chance to acquire the game values without consuming the game values such as coins and credits.

FIGS. **21** and **22** are flow charts showing the processing for executing the game in the chance mode. The process is invoked and executed in the chance mode game processing shown in FIG. **15** (step S**408**).

Whenever proceeding to the chance mode, the main CPU **222** executes the memory initialization process (step S**2111**). The main CPU **222** clears unnecessary data and information from the temporary working space of the RAM **226**. The unnecessary data and information includes, for example, the payout data, awarding or failure information, and the to-be-stopped symbol information determined in the previous unit game.

Then, the main CPU **222** determines one of the symbol code determination table from among the symbol code determination tables **341** to **343** at random (step S**2113**). In this process, it is preferable to generate the random number and select one of the three symbol code determination tables **341** to **343** corresponding to the value of the generated number.

Then, the main CPU **222** lights backlights of the five reels **52**A to **52**E with a color corresponding to one of the symbol code determination tables selected in the process at step S**2113** (step S**2115**). Driving the backlight driver **266** described above can light the backlight with the color corresponding to the symbol code determination table. For example, the backlight lights in red when the symbol code determination table **341** is selected. The backlight lights in yellow when the symbol code determination table **342** is selected. The backlight lights in blue when the symbol code determination table **343** is selected.

Although the example described above shows the case where the backlight is lighted with the color corresponding to the selected symbol code determination table, the other lamp may be lighted, a predetermined image may be displayed with the color corresponding to the display, or an image corresponding thereto may be displayed. What is necessary is that the process at step S**2115** is the process capable of visibly showing a player one of the symbol code determination tables selected in the process at step S**2113**.

In this manner, the way of display is diversified according to the selected symbol code determination table, so that a player can imagine a variety of reasons so as to be caught in the game. Furthermore, it is possible to give feelings of expectation and tension to a player who has already known the way of display.

Then, the main CPU **222** makes the "START" button **79** ineffective (step S**2117**). Thus, the unit games do not start even if the player operates the "START" button **79**.

Then, the CPU **222** displays a chance mode enter report display screen on the video display unit **110** (step S**2119**). For example, a large "Sapphire CHANCE!!" letters and a large sapphire symbol are displayed. The appearance of the "SAPPHIRE" symbol thus enables the player to recognize the entering to the chance mode.

Furthermore, as shown in FIG. **33**, letters "Up to 7 FREE GAMES" may also be displayed under the chance mode enter report display screen. This enables the player to recognize that the chance mode games are the free games composed of seven unit games. The unit games being executed for seven times can raise expectations of the player. Furthermore, the chance mode game being the free game makes it possible to recognize that the games can start without BET operation. Also, since the game can be played without consuming the credits, it is possible to raise expectations of the player further.

As described above, such display can give the player recognition that the game mode enters from the normal mode into the chance mode. In particular, since the symbols do not start scrolling until a predetermined period of time has elapsed even if the "START" button **79** is operated, the player can be prevented from misidentifying the slot machine **10** as

being out of order by explicitly demonstrating the chance mode enter report display screen on the video display unit **110**.

Then, the main CPU **222** determines whether or not a predetermined period of time has elapsed (step S**2121**). Upon determining that the predetermined period of time has not elapsed (NO), the main CPU **222** returns the process to step S**2121**.

Upon determining that the predetermined period of time has elapsed (YES), the main CPU **222** erases the chance mode enter report display screen displayed in the process at step S**2119** from the video display unit **110** (step S**2123**). This enables the player to visibly recognize that the games in the chance mode can be started.

Then, the main CPU **222** increments the count value of the game counter which indicates the serial number of the chance mode games to be executed (step S**2125**). Since the count value of the game counter is initialized to be zero by means of the process at step S**2111**, the count value of the game counter is set to 1 in the initial (first) chance mode game.

It is preferable that an effect image is displayed on the video display unit **110** in accordance with the count value when the count value is updated in the process at step S**2125**. In this way, it is possible to show the player the progress of the chance mode games, and thus to give the player feelings of expectation and tension.

Then, the main CPU **222** makes the "START" button **79** effective (step S**2127**). Due to the execution of the process described above, the player cannot operate the "START" button **79** until the predetermined period of time has elapsed. Therefore, the unit games do not start although the player operates the "START" button **79**, the player can recognize that the game mode enters from the normal mode into the chance mode.

In particular, since the player cannot start playing the unit games although he/she overlooks the letters "CHERRY CHANCE! !" displayed on the video display unit **110**, the player can recognize that the game mode enters from the normal mode into the chance mode. As described above, the player can recognize that the game mode proceeds from the normal mode to the chance mode by both the effect on the video display unit **110** and the progress of the unit games on the symbol display unit **40**.

Then, the main CPU **222** determines whether or not the "START" button **79** is operated by the player (step S**2129**). Upon determining that the "START" button **79** is not operated by the player (NO), the main CPU **222** returns the process to step S**2129**.

Upon determining that the "START" button **79** is operated by the player (YES), the main CPU **222** executes the symbol determination process (step S**2211**). In this process, the symbol code determination table selected in the process at step S**2113** is used. More specifically, the main CPU **222** first generates five, namely first to fifth, random numbers. Then, the main CPU **222** determines first to fifth symbol codes using the first to fifth random numbers with reference to the selected symbol code determination tables **341** to **348**, respectively.

The first random number is the random number for determining a symbol code of a to-be-stopped symbol in the first symbol column. The second random number is the random number for determining a symbol code of a to-be-stopped symbol in the second symbol column. The third random number is the random number for determining a symbol code of a to-be-stopped symbol in the third symbol column. The fourth random number is the random number for determining a symbol code of a to-be-stopped symbol in the fourth symbol column. The fifth random number is the random number for determining a symbol code of a to-be-stopped symbol in the fifth symbol column.

Then, the main CPU **222** executes the process to rearrange the symbols (step S**2213**). The process of rearranging the symbols causes the scroll of the first to fifth symbol columns to be started, and then stops the scroll of the first to fifth symbol columns after a predetermined period of time has elapsed. At that time, the symbol matrix of three rows and five columns is rearranged in the display window **56** so that the symbols of five symbol codes (to-be-stopped symbols) determined in the process at step S**2211** appear in the second column in the display window **56** (the second column in the symbol matrix formed in the display window **56**).

Then, the main CPU **222** determines whether or not a predetermined winning combination is achieved by the rearranged symbol matrix, and pays out the payout amount corresponding to the achieved winning combination when the predetermined winning combination is achieved (step S**2215**).

Then, the main CPU **222** determines whether or not the value of the counter is seven (step S**2217**). The value of the counter indicates the number of times of the chance mode games in that session. For example, if the value of the counter is three, it indicates that the third chance mode game is executed in that session. The determination process at step S**2217** is the process for determining whether or not the seventh chance mode game is executed, i.e., the last chance mode game is executed in that session. More specifically, the chance mode is terminated and then the mode returns to the normal mode upon satisfying the end condition of the chance mode.

Upon determining that the value of the counter is seven (YES) in the determination process at step S**2217**, the main CPU **222** terminates the subroutine.

On the other hand, upon determining that the value of the counter is not seven (NO) in the determination process at step S**2217**, the main CPU **222** determines whether or not more than three "7" symbols appear in one of the pay lines.

Upon determining that more than three "7" symbols appear in one of the pay lines (YES), the main CPU **222** initializes the value of the counter, e.g., sets it to zero, and then returns the process to the above-mentioned step S**2127**. In this manner, it is possible to discontinue the chance game in the current session and then start afresh the chance games in the next session from the first game. In this way, the chance game is not simply added, but the current chance game is terminated so as to start afresh the chance game. It is thus possible to limit the number of games that a player can play.

Shifting the session from the current session to the next one enables the games to be played in a row. More specifically, the chance games can be played in a row by executing the chance games in a plurality of sessions.

Upon determining that more than three "7" symbols do not appear in one of the pay lines (NO), the main CPU **222** returns the process to step S**2125** described above. In this way, it is possible to continuously carry out the chance games in the current session.

As described above, the process at step S**2113** selects a symbol code determination table from among the symbol code determination tables **341** to **343** at random. The symbol code determination table **341** is the table in which the number of times of the free games to be executed in a row is determined to be about 4.5 times (the probability of executing the games in a row is 82%). The symbol code determination table **342** is the table in which the number of times of the free games to be executed in a row is determined to be about 3.0 times

(the probability of executing the games in a row is 75%). The symbol code determination table **343** is the table in which the number of times of the free games to be executed in a row is determined to be about 2.0 times (the probability of executing the games in a row is 67%). In this way, a plurality of symbol code determination tables is selected at random, so that the average number of times of the free games in a row can be specified to a desired number of times. It is thus possible to achieve the balance between the benefit that a casino can obtain and the benefit given to a player.

The symbol code determination tables **341** to **343** are the tables which are specified so that the symbol "7" is selected with a certain probability in each of the first to seventh chance games. On the other hand, the tables may be used each of which is specified so that the symbol "7" is selected in each of the first to seventh chance games with the probabilities different from one another. For example, the symbol code determination table **341** is composed of seven tables, namely the symbol code determination tables **341**(**1**) to **341**(**7**). In this way, when the symbol code determination table **341** is selected in the process at step S**2113**, the symbol code determination table **341**(**1**) is selected in the first chance game, and then five random numbers, i.e., the first to fifth random numbers are generated to determine the first to fifth symbol codes. The symbol code determination table **341**(**2**) is selected in the second chance game, and then five random numbers, i.e., the first to fifth random numbers, are generated to determine the first to fifth symbol codes. In this manner, the symbol code determination tables to be used are changed in turn from the table **341**(**1**) to the table **341**(**7**) with increase in the number of the chance games.

For example, when the probability of appearance of the symbol "7" is set to become gradually lower in order from the symbol code determination tables **341**(**1**) to **341** (**7**), the games can be difficult to be played in a row as the chance games progress. It is thus possible to give a player the feelings of expectation and tension.

Likewise, the symbol code determination table **342** is also composed of seven tables, i.e., the symbol code determination tables **342**(**1**) to **342**(**7**). The symbol code determination table **343** is also composed of seven tables, i.e., the symbol code determination tables **343**(**1**) to **343**(**7**).

The probability of appearance of the symbol "7" may be set to become gradually higher or to be random as the chance games progress.

<<<Overview of Chance Mode>>>

The appearance of the "SAPPHIRE" symbol in the normal mode makes the mode enter into the chance mode. Entering into the chance mode first provides a player with seven free games. If more than three "7" symbols appear one of the pay lines before reaching the seventh free game, the play is terminated at the current free game, and then seven free games are given anew. For example, when more than three "7" symbols appear in one of the pay lines in the third free game, the free games are temporarily terminated without completing the remaining four free games, and then seven free games are started anew from the first free game. If more than three "7" symbols do not appear in one of the pay lines by the end of seven free games, the chance mode is terminated and then the mode returns to the normal mode.

In the conventional chance mode, free games are simply added when a predetermined condition is established in the chance mode. In contrast, in the free games in the chance mode according to the present embodiment, when a predetermined condition is established in the chance mode, the current free game is temporarily terminated, and then next free games are started afresh from the first free game. This can prevent an excessive benefit from being given to a player, and the benefit to the parlor such as a casino can be ensured. Furthermore, the limited number of free games given to a player makes it possible to give a player an appropriate feeling of tension. Moreover, since the number of free games is limited, it is possible to easily change the status from being difficult to consume the game media (the chance mode) to being easy to consume the game media (the normal mode).

<<<Modification>>>

The process at step S**2113** in FIG. **21** described above has shown the case where a symbol code determination table is determined from among three symbol code determination tables **341** to **343** at random. In this way, the symbol code determination table may be determined not only at random but corresponding to the history of the game.

For example, a payout rate is calculated as the history of the game each time the unit game ends so as to store it in the RAM **226**. If the payout rate is included between the first payout rate and the second payout rate, the symbol code determination table **342** is selected. More specifically, if the payout rate is included between the first payout rate and the second payout rate, the payout rate is regarded as that desired by the casino, so that the symbol code determination table **342** is selected in which the number of free games to be executed in a row is an average number of times.

If the payout rate is higher than the first payout rate, the symbol code determination table **343** is selected. More specifically, if the payout rate is higher than the first payout rate, the payout rate is regarded as one higher than that desired by the casino, so that the symbol code determination table **343** is selected in which the lower number of free games is to be executed.

If the payout rate is lower than the first payout rate, the symbol code determination table **341** is selected. More specifically, if the payout rate is lower than the first payout rate, the payout rate is regarded as one lower than that desired by the casino, so that the symbol code determination table **343** is selected in which the higher number of the free games is executed.

In this way, the symbol code determination table is selected corresponding to the payout rate so as to limit the number of free games to be executed in a row, so that it is possible to achieve the balance between the benefit for a player and the benefit for a casino.

In addition, although the example described above uses the payout rate as the history of the game, other information may be used. For example, the number of times of the mode change entering into the chance mode and the number of times of the free games to be executed in a row may be used.

Furthermore, although the example described above shows the case where a single symbol code determination table is determined in the process at step S**2113** in FIG. **21** and that symbol code determination table is continuously used until the chance mode ends, the symbol code determination table may be determined while the chance mode is going on. In this way, the symbol code determination table can be changed even while the chance mode is going on and the free games are being executed in a row.

For example, the symbol code determination table may be determined each time the unit game is started in the chance mode, i.e., with each unit game. Furthermore, the symbol code determination table may be determined only when the first free game starts afresh upon executing the free games in a row. Moreover, a symbol code determination table may be determined from among three symbol code determination tables **341** to **343** after it is determined at random whether or

not the symbol code determination table is determined and then determined that the symbol code determination table is going to be determined.

Also in such a case, the determination of the symbol code determination table may be determined at random, or may be determined corresponding to the history of the game (such as the payout rate, the number of times of the mode change entering into the chance mode, the number of times of the free games to be executed in a row, etc.)

Furthermore, in the process at step S**2121** in FIG. **21** described above, the "START" button **79** has been inactivated (step S**2117**) and the chance mode enter report display screen has been displayed on the video display unit **110** (step S**2119**) until the predetermined period of time has elapsed. The predetermined period of time is a constant period of time for any players. However, that may be the period of time in which a player who is playing the game over a long time or a skilled player cannot play the game further and can do nothing but waiting therefor. Thus, it is favorable to change the predetermined period of time depending on the player. More specifically, if it is determined that the player is one who is playing the game over a long time or a skilled one, the predetermined period of time is shortened. This enables the chance mode games to be immediately executed, and thus the availability can be enhanced.

In order to determine whether or not the player is one who is playing the game over a long time or a skilled one, the period of time between the unit games is continuously measured. It can thus be determined that the player is changed to the other one when longer time is spent between the unit games than the predetermined period of time. Moreover, in case that the player's identification information can be acquired by means of, for example, a PTS (Player Tracking System), it is possible to determine whether or not the player is a changed one or a skilled one in accordance with the change of the identification information, the contents of the identification information, etc.

Furthermore, so-called scatter symbols are prevented from appearing in the chance mode games. The scatter symbols are the symbols that appear regardless of the pay lines upon a plurality of symbols being rearranged. The payout amount is determined in accordance with the number of the appeared scatter symbols. The payout amount of the scatter symbols is generally small because it may be inappropriate in the chance mode games. In addition, if the scatter symbols with large amount of payout are specified, the scatter symbols may appear in the chance mode games.

Although the so-called mechanical reels **52**A to **52**E are used in the example described above, the structure using video reels may be employed.

What is claimed is:

1. A gaming machine capable of obtaining a game result based on a plurality of rearranged symbols, comprising:

a symbol display unit for rearranging the plurality of symbols;

a memory having a first determination table for causing a first symbol to appear on the symbol display unit in a normal game mode with a first probability, the normal game mode being to execute a normal mode game, and a second determination table for causing a second symbol to appear on the symbol display unit in a chance game mode with a second probability, the chance game mode being to execute a chance game; and

a controller for executing processes of:

switching the normal game mode into the chance game mode and executing the chance game under the condition that the first symbol appears on the symbol display unit in the normal game mode;

terminating the chance game mode under the condition that a number of unit games executed in the chance game of a current session reaches a predetermined number; and

discontinuing the chance game of the current session and starting the chance game of a new session under the condition that the number of unit games executed in the chance game of the current session is less than the predetermined number and the second symbol appears on the symbol display unit in the chance game of the current session.

2. The gaming machine according to claim **1**, wherein:

the second determination table includes a plurality of determination tables having probabilities different from one another; and

switching the normal game mode into the chance game mode includes

selecting a determination table from among the plurality of determination tables included in the second determination table at random.

3. The gaming machine according to claim **2**, wherein switching the normal game mode into the chance game mode further includes:

reporting information on the determination table that is selected from among the plurality of determination tables included in the second determination table.

4. A gaming machine capable of obtaining a game result based on a plurality of rearranged symbols, comprising:

a symbol display unit for rearranging the plurality of symbols;

a memory having a first determination table for causing a first symbol to appear on the symbol display unit in a normal game mode with a first probability, the normal game mode being to execute a normal mode game, and a plurality of second determination tables for causing a second symbol to appear on the symbol display unit in a chance mode, the plurality of second determination tables having probabilities different from one another, and the chance game mode being to execute a chance game; and

a controller for executing processes of:

switching the normal mode game into the chance game mode under the condition that a first symbol appears on a symbol display unit in the normal game mode;

selecting a second determination table from among the plurality of second determination tables at random upon switching the normal mode game into the chance game mode;

reporting information on selected one of the second determination tables;

initializing a number of executed unit games upon switching the normal mode game into the chance game mode;

starting the chance game of a current session;

counting the number of executed unit games in the chance game of the current session;

terminating the chance game mode under the condition that the number of games reaches a predetermined number in the chance game mode;

discontinuing the chance game of the current session under the condition that the number of executed unit games in the chance game of the current session is less than the predetermined number and a second symbol appears on the symbol display unit in the chance game of the current session;

initializing the number of executed unit games after discontinuing the chance game of the current session; and

starting the chance game of a new session after executing initializing the number of executed unit games.

* * * * *